

The jumping plant-lice (Hemiptera: Psylloidea) of Belarus

Liliya Serbina^{1,2}, Daniel Burckhardt¹ & Oleg Borodin³

¹ Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland

² Institut für Natur-, Landschafts- und Umweltschutz an der Universität Basel, St. Johannis-Vorstadt 10, CH-4056 Basel, Switzerland

³ National Academy of Sciences, Akademicheskaya street 27, 220072 Minsk, Belarus

Corresponding author: Liliya Serbina. E-mail: liliia.serbina@unibas.ch, liliya_serbina@mail.ru

Abstract: A checklist of the known psyllids of Belarus is given: 12 species (one of them doubtful) have been previously reported and 43 species are added here, bringing the number of confirmed species to 54. The psyllid fauna of the country remains poorly known. Based on information from surrounding countries, another 73 species can be expected. An illustrated identification key is provided for the 127 species whose occurrence in Belarus has been confirmed or is likely.

Keywords: Psyllids - Sternorrhyncha - host-plants - faunistics - identification key - Europe - Palaearctic Region.

INTRODUCTION

Jumping plant-lice or Psylloidea, a superfamily of Sternorrhyncha, are plant-sap sucking insects (Photo 1). Most psyllid species are associated with dicotyledonous plants, and are usually highly host-plant specific. At present there are almost 4000 described psyllid species world-wide (Li, 2011) representing probably less than half of the actually existing species number. Despite the fact that psyllids are most species-rich in the tropics and south temperate regions, the west Palaearctic fauna is the one which is best studied with around 400 species reported from Europe (Burckhardt, 2004). The study of Eastern European psyllids was initiated by Flor (1861) with a survey on the fauna of Livonia followed by a large number of publications dealing with the European part of the former Soviet Union (Gegechkori & Loginova, 1990).

The information on the psyllid fauna of Belarus is, however, scarce with only 12 recorded species of which one is doubtful (Loginova, 1961, 1962b; Palyakova, 1969; Byazdenka *et al.*, 1973; Gorlenko *et al.*, 1988; Sidlyarevich & Bolotnikova, 1992; Petrov, 2004, 2011; Petrov *et al.*, 2011; Petrov & Sautkin, 2013).

In the last 15 years psyllids were collected in all administrative regions of Belarus, mostly as by-catch of an Auchenorrhyncha survey. The aim of the present paper is to provide an updated checklist of psyllids from Belarus based on literature data and recently collected material. We also provide an illustrated identification key for the species recorded and those potentially occurring in Belarus, as the existing keys are outdated or incomplete.

MATERIAL AND METHODS

Unless stated otherwise, the material was collected by O. Borodin, is dry mounted and deposited in the Laboratory of Terrestrial Invertebrates of the State Science and Production Association “Research and Practical Centre of the National Academy of Sciences of Belarus for Bioresources” (Gosudarstvennoye Nauchno-Proizvodstvennoye Ob’yedineniye “Nauchno-Prakticheskiy Tsentr Natsional’noy Akademii Nauk Belarusi po Biore-sursam”) in Minsk. Material from the Naturhistorisches Museum, Basel (Switzerland) was examined for comparison.

For the transliteration of names and organisations from the Cyrillic to the Latin alphabet the BGN/PCGN system was used.

Morphological terminology mainly follows Ossiannilsson (1992), Hollis (2004) (wing venation) and Burckhardt (2010). Botanical nomenclature and classification follows Sautkina *et al.* (1999). Additional information on psyllid host-plants is available in Ossiannilsson (1992) and Ouvrard (2014). Generally useful identification keys are by Loginova (1964), Klimaszewski (1975) and Ossiannilsson (1992), though they are more or less outdated and should be used with caution. Photos and drawings were prepared from slide mounted specimens located in the Naturhistorisches Museum, Basel. Photos were made with KEYENCE VHX-2000 digital microscope.



Photo 1. Living *Livia junci*, photo kindly provided by Gernot Kunz.

Following abbreviations are used:

Checklist: BSU – Belarusian State University, MKAD – Minsk automobile ring road (Minskaya kol'tsevaya avtomobil'naya doroga).

Identification key: AEL – length of distal portion of aedeagus, ALHW – antenna length : head width ratio, FPHW – female proctiger length : head width ratio, MP – male proctiger length.

SYSTEMATIC ACCOUNT

Checklist

The checklist is alphabetical using the classification of Burckhardt & Ouvrard (2012).

Aphalaridae

Aphalarinae

Aphalara affinis (Zetterstedt, 1828)

Material examined: Minsk: 1 adult without abdomen, Molodechno district, nr Myasota, 6.ix.2002.

Aphalara avicularis Ossiannilsson, 1981

Material examined: Brest: 1♀, Stolin district, Belousha, 15.viii.2005.

Comments: The record of *A. polygoni* by Loginova (1961) from the Vitebsk region may concern *A. avicularis* or *A. freji*. Without revising the original material it is not possible to decide which species is concerned.

Aphalara freji Burckhardt & Lauterer, 1997

Material examined: Gomel': 1♂, Lel'chitsy district, 0.5 km NE Krasnoberezh'ye, river Ubort' floodplain, 5.viii.2004. – Minsk: 1♀, Minsk district, Shchemyslitsy, Dubrava Natural Monument, 26.ix.2013, on conifers (L. Serbina). – 3♂, same but nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest. – 5♂, 1♀, same but nr Tarasovo, nr Gardeners' partnership Zvezdnoye, 29.ix.2013.

Comments: The record of *A. polygoni* by Loginova (1961) from the Vitebsk region may concern *A. avicularis* or *A. freji*. Without revising the original material it is not possible to decide which species is concerned.

***Craspedolepta crispata* Lauterer & Burckhardt, 2004**

Material examined: Minsk: 4♂, 2♀, Volozhin district, Rakov, 28.vii.1997, meadow.

***Craspedolepta flavipennis* (Foerster, 1848)**

Material examined: Minsk: 1♀, Myadel' district, Logoviny, train station, 5.vii.2009, meadow (L. Serbina).

***Craspedolepta latior* Wagner, 1944**

Material examined: Minsk: 2♂, 1♀, Minsk district, river Ptich' bank, nr train station Ptich', 15.vii.2009 (L. Serbina). – 1♀, same but Molodechno district, nr Vyazynka, canal bank, 9.vii.2002. – 11♂, 27♀, same but Myadel' district, Logoviny, nr train station, 5.vii.2009, meadow (L. Serbina). – 1♂, 1♀, same but nr Naroch', 9.vii.2009.

***Craspedolepta malachitica* (Dahlbom, 1851)**

Material examined: Gomel': 1♀, Kalinkovichi district, 0.5 km E Turovichi, 23.vii.2005, dry meadow, on *Artemisia* sp. – Grodno: 1 adult without abdomen, Mosty district, 3.5 km NW Peski, river Zel'vyanka floodplain, 24.vi.2005 (Y. Gerashchenko). – Minsk: 4♀, Minsk district, Shchemyslitsy, Dubrava Natural Monument, 15.v.2008 (L. Serbina). – 2♀, same but river Ptich' bank, nr train station Ptich', June 2008. – 1♀, same but Molodechno district, nr Povyazyn', 1.vii.2001. – 2♂, same but nr canal bank, 9.vi.2002. – 1♂, same but nr Radoshkovichi, slope Minsk-Vileyka channel system, 22.vi.2005. – 1♀, same but nr Sitsevichi, 12.vii.2005, pine forest (A. Egayan). – 2♂, 6♀, same but river Udranka bank, nr bus stop, 14.vii.2009 (L. Serbina). – 1♂, 2♀, same but Myadel' district, nr Naroch', 2.vii.2009. – 10♂, 24♀, same but Logoviny, nr train station, 5.vii.2009. – 84♂, 99♀, same but nr Naroch', 9.vii.2009. – 1♀, same but Volozhin district, nr Kaldyki, 11.vii.2007, mixed forest. – Vitebsk: 2♀, Lepel' district, nr Domzheritsy, nr boarding school and pond, 31.vii.2001, on *Artemisia dracunculus*. – 1♀, same but river Buzyanka, 300 m upstream from boat station, 1.viii.2001.

***Craspedolepta nervosa* (Foerster, 1848)**

Material examined: Grodno: 1♀, Mosty district, 3.5 km NW Peski, 24.vi.2005, river Zel'vyanka floodplain. – Minsk: 1♀, Borisov district, 2 km NW Peresady, nr train station "Proletarskaya pobeda", lowland, 6.viii.2002, pine forest. – 1♀, same but Logoysk district, nr Besyady, river Udra floodplain, 26.vi.2002. – 1♀, same but Kupa-

lovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow. – 4♂, 3♀, same but 0.5 km SW Matski, hill, meadow. – 1♀, same but Minsk district, nr train station Kryzhovka, 3.vi.2001, meadow in pine forest. – 1♂, 1♀, same but nr Chirovichi, 9.vi.2002, dry meadow. – 1♂, same but Shchemyslitsy, nr Biological Faculty, BSU, 18.vi.2002. – 1♀, same but Dubrava Natural Monument, 19.vi.2002. – 1♀, same but nr Biological Faculty, BSU, 1.vii.2002. – 1♂, 3♀, same but 19.vi.2006 (L. Serbina). – 1♂, same but Molodechno district, nr Vyazynka, 16.vi.2001, dry meadow. – 1♀, same but 2.vii.2001. – 1♂, same but 0.5 km E Vyazynka, hill, 3.vii.2001. – 1♂, same but nr Vyazynka, canal bank, 12.vi.2002. – 1♂, 3♀, nr Shipulichy, river Zapadnaya Berezina bank, 27.vi.2002. – 1♂, same but river Udranka bank, nr bus stop, 14.vii.2009 (L. Serbina). – 1♂, 1♀, same but Myadel' district, nr Naroch', 2.vii.2009. – 2♂, 3♀, same but Logoviny, nr train station, 5.vii.2009, meadow. – 3♂; same but 0.5 km S Nikol'tsy, Gomza Dendrological Garden, 6.vii.2009. – 1♂, 1♀, same but Soligorsk district, 7 km from Soligorsk, 24.vi.2004 (A. Egayan). – 1♀, same but 25.vi.2004. – 1♀, same but Stolbtsy district, nr train station Kolosovo, 26.v.1993, field in front of pine forest (V. Karasev). – Vitebsk: 2♂, 2♀, Gorodok district, 17.vi.2008, dry meadow, on *Achillea millefolium*.

***Craspedolepta omissa* Wagner, 1944**

Material examined: Minsk: 1♀, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow. – 1♀, same but Minsk district, 2 km NE Shchemyslitsy, along train station, 12.vii.2005, forest plantation. – 2♂, 1♀, same but river Ptich' bank, nr train station Ptich', 15.vii.2009 (L. Serbina). – 2♀, same but Botanical Garden (Minsk), 16.vii.2009. – 1♂, same but Molodechno district, nr Vyazynka, station, hill, 3.vii.2001. – 2♂, 2♀, same but nr station Shipulichy, 27.vi.2002, river Zapadnaya Berezina bank, on *Artemisia* sp. – 1♂, same but Myadel' district, nr Naroch', 2.vii.2009 (L. Serbina). – 6♂, 10♀, same but Logoviny, nr train station, 5.vii.2009. – 1 adult without abdomen, same but nr Antonisberg, 300 m behind resting place, meadow. – 3♂, 5♀, same but 0.5 km S Nikol'tsy, Gomza Dendrological Garden, 6.vii.2009. – 1♀, same but nr Naroch', 9.vii.2009. – 1♂, same but Vileyka district, nr hydraulic station, 0.5 km N Budishche, 9.vii.2005, dry meadow.

***Craspedolepta subpunctata* (Foerster, 1848)**

Material examined: Minsk: 1♀, Molodechno district, nr Vyazynka, 16.vi.2001, willow thicket. – 1♀, same but nr Chirovichi, 9.vi.2002.

Rhinocolinae***Rhinocola aceris* (Linnaeus, 1758)**

Material examined: No locality data, 1♂, 1♀ (S. Buga).

Liviidae**Euphyllurinae*****Psyllopsis discrepans* (Flor, 1861)**

Material examined: Gomel': 1♀, Khoyniki district, Orevichi, Poleskiy Natural Reserve, 21.viii.1991, Malaise trap. – Minsk: 15♂, 30♀, Soligorsk district, 7 km from Soligorsk, 24.vi.2004 (A. Egiyan).

***Psyllopsis distinguenda* Edwards, 1913**

Material examined: Vitebsk: 1♂, 1♀, Gorodok district, Carla-Marksa Street, 17.vi.2008, on *Fraxinus* sp. (S. Buga).

***Psyllopsis fraxini* (Linnaeus, 1758)**

Records: Recorded by Petrov (2011) from the south central region of the Belarusian Ridge.

***Psyllopsis fraxinicola* (Foerster, 1848)**

Material examined: Minsk: 1♂, Soligorsk district, 7 km from Soligorsk, 24.vi.2004 (A. Egiyan).

***Strophingia ericae* (Curtis, 1835)**

Material examined: Grodno: 2♀, Iv'yev district, Naliboki pushcha, 4 km NE Malaya Chapun', 22.vi.2002, pine forest, on *Calluna* sp.

Liviinae***Camarotoscena speciosa* (Flor, 1861)**

Material examined: Minsk: 1♂, Minsk, alley nr Lyubimov Ave., 23.iv.2013, on *Tilia* sp. – 3♀, same but Botanical Garden (Minsk), 26.iv.2013, on *Rhododendron* sp. (L. Serbina).

Psyllidae**Psyllinae*****Arytaina genistae* (Latreille, 1804)**

Material examined: Vitebsk: 2♂, 1♀, Lepel' district, nr Kraysy, 1 km along road in direction Perechodtsy, 2.viii.2001, pine forest.

***Baeopelma foersteri* (Flor, 1861)**

Records: Recorded by Loginova (1962b) as *Psylla foersteri* from the Vitebsk region.

Material examined: Gomel': 2♂, 3♀, Zhitkovichi district, Khvoyensk, 11.vii.1999, pine forest, on *Alnus glutinosa* (S. Buga). – 3♂, same but 1.5 km SW Novyye Milevichi, river Sluch' floodplain, 4.viii.2004. – 15♂, 9♀, same but 2 km SW Otskovannoye, 5.viii.2004. – 1♂, same but nr Novyye Milevichi, nr river Sluch', 15.ix.2004. – Minsk: 1♂, 2♀, Logoysk district, 0.5 km SW Matski, hill, 7.vii.2004, meadow. – 1♀, same but Minsk district, Kupalovskiy National Park, nr Lekarovka, dry meadow, on *Alnus incana*. – 1♂, 1♀ same but Botanical Garden (Minsk), 16.vii.2009, on *Alnus* sp. (L. Serbina). – 2♂, 1♀, same but river Ptich' bank, nr train station Ptich', 22.vii.2009. – 3♂, 5♀, same but Myadel' district, Naroch', nr Antonisberg, 30.vi.2005, (A. Egiyan). – 4♂, 3♀, same but 1.vii.2005, on *Alnus incana*. – 1♀, same but nr Naroch', 3.vii.2009, on *Alnus* sp. (L. Serbina). – 1♂, same but 0.5 km S Nikol'tsy, Gomza Dendrological Garden, 6.vii.2009. – 1♀, same but Soligorsk district, Soligorsk, 25.vi.2004 (A. Egiyan). – 5♂, 4♀, same but Volozhin district, Rakov, river Isloch' floodplain, 28.vii.2004. – 3♂, 6♀, same but on *Alnus glutinosa*. – 2♂, 2♀, same but nr Kaldyki, 19.vii.2007, mixed forest, on *Alnus* sp. (L. Serbina). – Mogilev: 1♀, Klichev district, Lozovitsa, 20.vii.1997, pine forest. – Vitebsk: 1♀, Postavy district, lake Chetvert' south bank, 10.vii.2005.

***Cacopsylla ambigua* (Foerster, 1848)**

Material examined: Brest: 2♂, Drogichin district, Wildlife sanctuary "Zvonets", 16.vi.1999. – Gomel': 2♀, Zhitkovichi district, 1.5 km SW Novyye Milevichi, river Sluch' floodplain, 4.viii.2004, on *Salix* sp. – Grodno: 1 adult without abdomen, Iv'yev district, Naliboki pushcha, 0.5 km S Potashnya, nr river, 22.viii.2002, meadow (E. Shestakov). – Minsk: 4♂, 8♀, Logoysk district, nr Gayany, 28.vi.2004, on *Salix* sp. – 1♂, 2♀, same but Minsk district, train station Kryzhovka, river Poplav bank, 3.vi.2001, floodplain meadow. – 2♀, same but nr Shchemyslitsy, NW Dubrava Natural Monument, 6.vi.2002. – 1♀, 1 adult without abdomen, same but 15.vi.2002. – 4♀, same but 18.vi.2002. – 2♀, same but 4.vii.2002. – 1♂, 1♀, same but field between MKAD Kurasovshchina and South-West district, 24.v.2003. – 1♂, same but Shchemyslitsy, nr Biological Faculty, BSU, 19.vi.2006. – 1♂, 4♀, same but Molodechno district, nr Vyazyinka, 16.vi.2001, bog. – 1♂, 3♀, same but nr station Shipulichi, river Zapadnaya Berezina floodplain, meadow edge, 27.vi.2002. – 1♀, same but nr Vyazyinka, 20.v.2003. – Vitebsk: 1♂, Gorodok district, 2 km NE Machalovo, river Lovat' floodplain, 4.vi.2000, bog (S. Buga).

***Cacopsylla brunneipennis* (Edwards, 1896)**

Material examined: Minsk: 2♂, 3♀, Logoysk district, Gayany, 28.vi.2004. – 2♂, 3♀, same but Minsk district, nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest, on conifers (L. Serbina).

***Cacopsylla crataegi* (Schrank, 1801)**

Records: Recorded from Belarus by Gorlenko *et al.* (1988) as *Psylla crataegi* and by Petrov & Sautkin (2013) as *Cacopsylla crataegi* from the Minsk region.

***Cacopsylla hippophaes* (Foerster, 1848)**

Material examined: Minsk: 1♂, 3♀, Minsk district, nr Tarasovo, nr Gardeners' partnership Zvezdnoye, 29.ix.2013, on *Hippophae rhamnoides* (L. Serbina).

***Cacopsylla ledi* (Flor, 1861)**

Material examined: Gomel': 1♀, Zhitkovichi district, Pripyatskiy National Park, 11.vii.1999, pine forest, on *Ledum* sp. – Minsk: 1♀, Myadel' district, 1 km SW Kochergi, 16.vii.2005, pine forest, on *Ledum* sp. – 1♀, same but Leytsy, 5.v.2008. – Mogilev: 1♀, Klichev district, Razvadovo, 20.vii.1997, pine forest, on *Ledum* sp. – 1♂, 1♀, same but Lozovitsa, 31.viii.1997. – 1♀, Razvadovo, 23.vii.1998. – 3♀, same but 17.viii.1998. – 1♂, same but, 17.ix.2000, pine forest. – Vitebsk: 1♂, Dokshitsy district, Krulevshizna, 11.vii.2000, pine forest (L. Chumakov). – 1♀, same but 22.x.2000. – 1♀, same but Rossony district, 0.8 km N Osinniki, 11.ix.1998, pine forest, on *Ledum* sp.

***Cacopsylla mali* (Schmidberger, 1836)**

Records: Recorded by Byazdenka (1973) as *Psylla mali* from the Minsk region.

Material examined: Minsk: 1♂, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow. – 1♂, 2♀, same but Minsk district, Shchemyslitsy, Dubrava Natural Monument, 16.ix.1997, on *Malus sylvestris* (S. Buga). – 1♀, same but 15.vii.2009, on *Malus* sp. (L. Serbina). – 1♀, same but Molodechno district, nr Vyazyinka, 16.vi.2001, bog. – 2♀, same but 29.vii.2001. – 1♀, same but nr station Shipulichy, river Zapadnaya Berezina floodplain, 27.vi.2002. – 2♀, same but Myadel' district, Naroch' orchards, 2.vii.2009 (L. Serbina). – 1♀, same but Volozhin district, nr Kaldyki, 11.vii.2007, mixed forest.

***Cacopsylla mali* (Schmidberger, 1836) group**

Material examined: Minsk: 1♀, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, meadow. – 1♀, same but Minsk district, Shchemyslitsy, Dubrava Natural Monument, 15.vi.2002. – 1♀, same but nr Biological Faculty, BSU, 1.vii.2002. – 1♀, same but Molodechno district, nr Vyazyinka, 1.vi.2001. – 1 adult without abdomen, same but Myadel' district, nr Naroch', 4.vii.2009 (L. Serbina). – 1♂, same but Nesvizh district, nr Nesvizh, 29.vi.2004, on *Prunus cerasifera*.

Comment: Due to the poor state of the material the specimens cannot be identified to species. They could be any member of the *C. mali* group: *C. mali*, *C. peregrina*, *C. sorbi* or *C. ulmi*.

***Cacopsylla moscovita* (Andrianova, 1948)**

Material examined: Grodno: 1♂, 1♀, Iv'yev district, Naliboki pushcha, 4.5 km E Malaya Chapun', 22.viii.2002, on *Salix* sp.

***Cacopsylla parvipennis* (Löw, 1877)**

Material examined: Minsk: 1♀, Myadel' district, 2 km W Cheremshitsy, river Narochanka floodplain, 9.vii.2005.

***Cacopsylla peregrina* (Foerster, 1848)**

Material examined: Minsk: 3♂, 7♀, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow. – 1♂, 1♀, same but Minsk district, stop "Kurasovshchina", 9.ix.1997, on *Crataegus* sp. (S. Buga). – 4♀, same but stop "Bol'nitsa", 13.ix.1997. – 4♂, 4♀, same but Shchemyslitsy, Dubrava Natural Monument, 21.v.1999. – 3♀, same but station "Polzhelishche", 18.ix.1999. – 2♀, same but Shchemyslitsy, track nr bus stop "Filial BGU", 11.vii.2009 (L. Serbina). – 1♂, 1♀, same but 22.vii.2009. – 15♀, same but 29.vii.2009. – 3♂, 4♀, same but Volozhin district, nr Kaldyki, 19.vii.2007, mixed forest.

***Cacopsylla pulchella* (Löw, 1877)**

Material examined: Gomel': 8♂, 2♀, Khoyniki district, Orevidi, 21.v.-18.vi.1991, Malaise trap. – 2♂, same but Zhitkovichi district, 14 km from Chvoensk, Pripyatskiy National Park, 26.viii.1999, pine forest. – Minsk: 2♂, Molodechno district, nr Vyazyinka, 16.vi.2001, dry meadow.

***Cacopsylla pulchra* (Zetterstedt, 1838)**

Material examined: Gomel': 1♂, Zhitkovichi district, Pripyatskiy National Park, 20.x.1998, pine forest. – Minsk: 1♂, Logoysk district, Gayany, 28.vi.2005. – 2♂, 1♀, same but Minsk district, nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest, on conifers (L. Serbina). – 1♂, same but Molodechno district, nr Vyazyinka, 16.vi.2001, bog, on *Salix* sp.

***Cacopsylla pyri* (Linnaeus, 1758)**

Records: Recorded from Belarus by Palyakova (1969), Gorlenko *et al.* (1988) as *Psylla pyri*.

***Cacopsylla pyrisuga* (Foerster, 1848)**

Records: Recorded from Belarus by Palyakova (1969) as *Psylla pyrisuga*.

***Cacopsylla saliceti* (Foerster, 1848) group**

Material examined: Grodno: 1♀, Iv'yev district, Naliboki pushcha, 2 km S Potashnya, 23.vi.2002, on *Salix* sp. – 1♀, same but 4.5 km E Malaya Chapun', 28.ix.2002. – Minsk: 1♀, Minsk district, nr Kryzhovka station, 3.vi.2001, alder forest. – 1♀, same but Myadel' district, Leytsy, 25.vi.2008. – 1♀, same but 0.5 km S Nikol'tsy, Gomza Dendrological Garden, 6.vii.2009, on *Salix* sp. (L. Serbina).

Comment: Single females of this species group cannot be correctly identified to species.

***Cacopsylla sorbi* (Linnaeus, 1767)**

Material examined: Minsk: 38♂, 32♀, Myadel' district, Naroch', nr Antonisberg, 28.vi.2005, on *Sorbus* sp. (A. Egiyan).

***Cacopsylla ulmi* (Foerster, 1848)**

Records: Recorded by Petrov (2011) from the south central region of the Belarusian Ridge.

Material examined: Gomel': 3♂, 3♀, Khoyniki district, Orevichi, Pripyatskiy National Park, 23.vii.1991, Malaise trap. – 6♂, 32♀, same but Polesskiy Natural Reserve, 21.viii.1991. – 1♀, same but Zhitkovichi district, Khvoyensk, truck patch, 14.vii.1999 (S. Buga). – Minsk: 1♂, Minsk district, Shchemyslitsy, nr train station "Roshcha", 15.vii.2009, on *Ulmus* sp. (L. Serbina).

***Chamaepsylla hartigii* (Flor, 1861)**

Material examined: Minsk: 1♀, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow, on *Betula pendula*.

***Psylla alni* (Linnaeus, 1758)**

Material examined: Brest: 4♂, 2♀, Gantsevichi district, 3 km SE Borki, 23.vii.2005, pine forest. – Gomel': 2♀, Zhitkovichi district, 1.5 km SW Novyye Milevichi, river Sluch' floodplain, 4.viii.2004. – 3♂, 5♀, 2 km, same but SW Otskovannoye, 5.viii.2004. – Grodno: 1♀, Mosty district, 3.5 km NW Peski, river Zel'vyanka floodplain, 23.vi.2005. – 1♀, same but 24.vi.2005. – Minsk: 62♂, 66♀, Logoysk district, nr Gayany, roadside lowland, 28.vi.2004, on *Alnus incana*. – 1♀, same but Kupalovskiy National Park, nr Lekarovka, 7.vii.2004. – 3♂, 6♀, same but 0.5 km SW Matski, hill, meadow. – 3♂, 4♀, same but Molodechno district, nr Vyazyinka, 16.vi.2001, bog. – 6♂, 3♀, same but 1.vii.2001, on *Alnus* sp. – 2♂, 4♀, same but river Udranka bank, nr bus stop, 2.vii.2008, on *Alnus incana* (L. Serbina). – 1♂, same but nr Naroch', 3.vii.2009, on *Alnus* sp. – 2♀, same but Nesvizh district, park "Al'ba", 29.vi.2004. – 2♂, 5♀, same but Volozhin district, Rakov, river Isloch' floodplain, 28.vii.2004, on *Alnus glutinosa*. – Vitebsk: 1♂, Gorodok district, 0.3 km SW Zadrach'ye, river Zadrach bank, 7.vi.2000, on *Alnus incana* (S. Buga).

***Psylla betulae* (Linnaeus, 1758)**

Material examined: Mogilev: 1♀, Klichev district, Razvadovo, 23.vii.1988, pine forest.

***Psylla buxi* (Linnaeus, 1758)**

Records: Recorded by Petrov *et al.* (2011), Petrov & Sautkin (2013) from the Minsk region.

***Psylla fusca* (Zetterstedt, 1828)**

Material examined: Minsk: 1♀, Logoysk district, Kupalovskiy National Park, nr Lekarovka, 26.vi.2002, dry meadow. – 28♂, 23♀, same but nr Gayany, downhill, 28.vi.2004, on *Alnus incana*. – 1♂, 1♀, same but Kupalovskiy National Park, nr Lekarovka, 7.vii.2004, dry meadow. – 5♂, 4♀, same but 0.5 km SW Matski, hill, meadow. – 1 adult without abdomen, same but Molodechno district, nr Vyazyinka, station, 1.vii.2001. – 1♂, same but 2.vii.2001, on *Alnus* sp. – 1 adult without abdomen, same but 29.vii.2001, linden alley. – 20♂, 17♀, same but river Udranka bank, nr bus stop, 2.vii.2008, on *Alnus incana* (L. Serbina). – 1♂, same

but Volozhin district, nr Kaldyki, 19.vii.2007, mixed forest, on *Alnus* sp.

Triozidae

Bactericera acutipennis (Zetterstedt, 1828)

Material examined: Vitebsk: 3♂, 1♀, Dokshitsy district, nr station Krulevshizna, 20.x.2000, pine forest (L. Chumakov).

Bactericera curvatineris (Foerster, 1848)

Material examined: Minsk: 1♂, Minsk district, nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest, on conifers (L. Serbina). – 1♂, 2♀, same but nr Tarasovo, nr Gardeners' partnership Zvezdnoye, 29.ix.2013. – Vitebsk: 1♂, Dokshitsy district, nr station Krulevshizna, 20.x.2000, pine forest (L. Chumakov).

Bactericera ? femoralis (Foerster, 1848)

Material examined: Vitebsk: 1♀, Dokshitsy district, station Krulevshizna, 20.x.2000, pine forest (L. Chumakov).

Comment: Due to the poor state of the specimen at hand the identification is questionable and it could be also *Bactericera acutipennis* or *B. bohémica*.

Bactericera reuteri (Šulc, 1913)

Material examined: Gomel': 2♂, Khoyniki district, Orevichi, Pripyatskiy National Park, 23.vii.1991, Malaise trap.

Bactericera striola (Flor, 1861)

Records: Recorded by Loginova (1962b) as *Triozia striola* from the Vitebsk region.

Bactericera substriola Ossiannilsson, 1992

Material examined: Minsk: 1♂, Minsk district, Shchemyslitsy, Dubrava Natural Monument, 4.vii.2002, on *Salix* sp. – 1♂, same but Molodechno district, station Shipulichi, river Zapadnaya Berezina bank, 27.vi.2002.

Trichohermes walkeri (Foerster, 1848)

Records: Recorded from Belarus by Petrov (2004).

Material examined: Minsk: 1♂, Molodechno district, nr Vyazyinka, 29.vii.2001.

Triozia anthrisci Burckhardt, 1986

Material examined: Minsk: 1♂, 1♀, Minsk district, nr Tarasovo, nr Gardeners' partnership Zvezdnoye, 29.ix.2013, on conifers (L. Serbina). – 1♀, same but Molodechno district, station Shipulichi, canal bank, 27.vi.2002. – Vitebsk: 1♂, Postavy district, lake Chetvert' south bank, 10.vii.2005.

Triozia apicalis Foerster, 1848

Records: Recorded from Belarus by Sidlyarevich & Bolotnikova (1992).

Triozia cerastii (Linnaeus, 1758)

Material examined: Minsk: 1♀, Volozhin district, nr Kaldyki, 11.vii.2007, mixed forest (L. Serbina).

Triozia flavipennis Foerster, 1848

Material examined: Minsk: 1♀, 3♀, Minsk district, nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest, on conifers (L. Serbina).

Triozia galii Foerster, 1848

Material examined: No locality data, 1♂ (S. Buga).

Triozia proxima Flor, 1861

Material examined: Minsk: 1♀, Minsk district, nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest, on conifers (L. Serbina).

Triozia remota Foerster, 1848

Material examined: Gomel': 4♀, Zhitkovichi district, Pripyatskiy National Park, 20.x.1998, pine forest (L. Chumakov). – Minsk: 2♂, 3♀, Minsk district, Shchemyslitsy, Dubrava Natural Monument, 26.ix.2013, on conifers (L. Serbina).

Triozia urticae (Linnaeus, 1758)

Material examined: Gomel': 9♂, 10♀, Zhitkovichi district, Krasnosel'ye, Pripyatskiy National Park, 21.v.1991, Malaise trap. – 1♂, 6♀, same but Orevichi, 21.v.-18.vi.1991. – 8♂, 20♀, same but 23.vii.1991. – Minsk: 3♂, 3♀, Logoysk district, Kupalovskiy National Park, nr Besyady, river Udra floodplain, 26.vi.2002, on various plants including *Urtica dioica*. – 1♂, 1♀, same but Minsk district, nr train station Kryzhovka, river Poplav bank, 3.vi.2001, floodplain meadow. –

1♂, same but nr Chirovichi, hill, 9.vi.2002, dry meadow. – 13♂, 4♀, same but Shchemyslitsy, Dubrava Natural Monument, 15.v.2008, on *Urtica dioica* (L. Serbina). – 1♂, same but 15.viii.2008. – 1 adult without abdomen, same but 25.vi.2009. – 2♂, 2♀, same but Botanical Garden (Minsk), 16.vii.2009. – 2♂, 14♀, same but Shchemyslitsy, Dubrava Natural Monument, 27.vii.2009. – 4♂, 2♀, same but 26.ix.2013, on conifers. – 1♂, 1♀, same but nr Aksakovshchina, Wildlife sanctuary Podsady, 28.ix.2013, mixed forest. – 1♂, same but nr Tarasovo, Gardeners' partnership Zvezdnoye, 29.ix.2013. – 7♂, 3♀, same but on conifers. – 2♂, 7♀, same but Molodechno district, nr Vyazyinka, 16.vi.2001. – 1♂, 1♀, same but 17.vi.2001, alder forest. – 3♂, 4♀, same but nr train station Shipulichy, river Zapadnaya Berezina bank, 27.vi.2002. – 1♀, same but nr Sitsevichi, riverbank, behind station, 18.v.2007. – 3♀, same but river Udranka bank, nr bus stop, 2.vii.2008 (L. Serbina). – 1♂, 1♀, same but Myadel' district, nr Naroch', 4.vii.2009, on *Urtica dioica*. – 8♂, 10♀, same but Volozhin district, nr Kaldyki, 11.vii.2007, mixed forest. – Vitebsk: 2♂, Dokshitsy district, Krulevshizna, 20.x.2000, pine forest (L. Chumakov).

Trioza velutina Foerster, 1848

Material examined: Minsk: 1♂, Molodechno district, nr Sitsevichi, riverbank, behind station, 18.v.2007.

DISCUSSION AND CONCLUSION

Despite the fact that the psyllid fauna of Central and Eastern Europe is generally well studied (Gegechkori & Loginova, 1990; Klimaszewski, 1975), little is known from Belarus with only 12 recorded species one of which is doubtful, i.e. *Aphalara polygoni* (Loginova, 1961, 1962b; Palyakova, 1969; Byazdzenka *et al.*, 1973; Gorlenko *et al.*, 1988; Sidlyarevich & Bolotnikova, 1992; Petrov, 2004, 2011; Petrov *et al.*, 2011; Petrov & Sautkin, 2013). Based on recent collections we confirm the presence of 4 previously recorded species and add 43 species, bringing the number of confirmed Belarusian psyllid species to 54. The majority of these are widely distributed in Europe and slightly more than half of them are associated with woody plants. The rest of the species is either introduced (*Cacopsylla pulchella*) or represents possible boreal elements ("peatbog" species as *Cacopsylla ledi*, *Psylla betulae*, *Bactericera acutipennis*). *Craspedolepta crispatis* is rare and has been recorded from only a few countries (Lauterer & Burckhardt, 2004).

The 54 species represent probably less than half of the number of species existing in the country by comparison with the surrounding countries: Poland 112 spp. (Klimaszewski, 1975; Głowacka, 1989, 1991; Głowacka & Migula, 1996; Drohojowska & Głowacka, 2011; Kuznetsova *et al.*, 2012), Northwest Russia 47

spp. (Loginova, 1954, 1961, 1962a, b, 1966, 1967, 1968, 1972a, b), Lithuania 12 spp. (Vengeliauskaitė, 1974; Malumphy *et al.*, 2009) and the former Livonia (now parts of Estonia and Latvia) 43 spp. (Flor, 1861) (Appendix 2). There are no published data available for the psyllid fauna from the North of Ukraine and it is, therefore, not included in Appendix 2. Based on the occurrence of their respective host-plants following additional species (not listed in Appendix 2) can be also expected to occur in Belarus: *Aphalara longicaudata* Wagner & Franz, 1961, *A. polygoni* Foerster, 1848, *A. ulicis* Foerster, 1848, *Craspedolepta campestris* Ossiannilsson, 1987, *C. innoxia* (Foerster, 1848), *Arytaina maculata* (Löw, 1886), *Cacopsylla affinis* (Löw, 1880), *C. breviantennata* (Flor, 1861), *C. picta* (Foerster, 1848), *C. rhamnocola* (Scott, 1876), *C. rhododendri* (Puton, 1871), *Psylla betulaenanae* Ossiannilsson, 1970, *Trioza scottii* Löw, 1880.

To stimulate further research on Belarusian psyllids we provide here an illustrated identification key for 127 species whose occurrence in the country has been documented or is likely given that they have been reported from adjacent countries (Appendix 2) or their host-plants occur in Belarus. Targeted field work sampling on potential host-plant is necessary to find also the more localised and rarer species.

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APPENDIX 1

Identification key to adult psyllids of Belarus

(*Cacopsylla merita* and *Eryngiofaga deserta* are not included in the key as their occurrence in Belarus is unlikely).

- 1 Vein R+M+Cu of forewing bifurcating into veins R and M+Cu (Fig. 1)..... 2
- Vein R+M+Cu of forewing trifurcating into veins R, M and Cu. – Triozidae (Fig. 2) 84
- 2 Metacoxa slender with flattened, tubercular meracanthus. On *Acer* – Aphalaridae, Rhinocolinae
..... *Rhinocola aceris*
- Metacoxa massive with distinct, spur-shaped meracanthus 3
- 3 Vertex longer than wide. Segment 2 the longest antennal segment. On monocots (*Carex*, *Juncus*). – Liviidae, Liviinae, *Livia* 4
- Vertex shorter than wide. Segment 3 the longest antennal segment. On dicots 6
- 4 Vertex, in dorsal view, forming narrowly rounded anterior lobes with deep median cleft between lobes. Forewing short, oval, with evenly curved anterior margin, bearing indistinct dots in apical half. On *Juncus*..... *Livia junci*
- Vertex, in dorsal view, forming broadly rounded anterior lobes with shallow indentation between lobes. Forewing longer, oblong oval or rhomboidal, in the middle with almost straight anterior margin, pattern different. On *Carex*..... 5
- 5 Forewing with subparallel fore and hind margins, without dark band along apical and anal margin. On *Carex*
..... *Livia crefeldensis*
- Forewing widening towards apical third, with broad dark band along apical and anal margin. On *Carex*
..... *Livia limbata*
- 6 Basal spine of metatibia always absent; apical metatibial spurs spaced in equal intervals, forming open crown; if grouped, then vertex flattened and rectangular with anterior lobes, or evenly passing into genae 7
- Basal spine of metatibia often developed; apical metatibial spurs always grouped. Head with distinct, though sometimes small, genal processes. – Psyllidae, Psyllinae 37
- 7 Head bearing genal processes. On *Fraxinus* – Liviidae, Euphyllurinae, *Psyllopsis* 8
- Head without genal processes, genae rounded anteriorly..... 11
- 8 Body green, forewing lacking dark pattern. Paramere axe-shaped (Fig. 3). Female proctiger distal to circumanal ring abruptly tapered (Fig. 4).....*Psyllopsis fraxinicola*
- Body with dark areas, forewing with dark veins and more or less expanded dark pattern. Male and female terminalia different..... 9
- 9 Forewing lacking continuous marginal band apically; membrane dark at apices of veins M and Cu, in the middle of vein Cu_{1a} and along vein Cu_{1b} (Fig. 5). Thorax yellow-orange, dark brown dorsally. Paramere, in profile, hammer-shaped with large anteriorly directed lobe (Fig. 6). Apex of female proctiger broad (Fig. 7).....
..... *Psyllopsis discrepans*
- Forewing with dark band along apical margin stretching from fore to hind margin (Figs 8, 11). Thorax yellow with brown or black pattern. Paramere, in profile, with posteriorly directed lobe (Figs 9, 12). Apex of female proctiger narrow (Figs 10, 13) 10
- 10 Forewing pattern very dark, extended and well-delimited (Fig. 8). Paramere with large rectangular posterior lobe (Fig. 9). Female proctiger with slight hump distal to circumanal ring (Fig. 10).....*Psyllopsis distinguenda*
- Forewing pattern slightly lighter, more reduced, often forming only narrow band, and less clearly delimited towards interior (Fig. 11). Paramere with small triangular posterior lobe (Fig. 12). Female proctiger straight or concave distal to circumanal ring (Fig. 13).*Psyllopsis fraxini*
- 11 Metabasitarsus without black spurs. On *Populus* – Liviidae, Liviinae*Camarotoscena speciosa*
- Metabasitarsus with 2 black spurs 12
- 12 Male proctiger without posterior lobes (Fig. 14). ALHW always < 1.0. On *Calluna vulgaris*. – Liviidae, Euphyllurinae*Strophingia ericae*
- Male proctiger with long, wing-like posterior lobes. ALHW often > 1.0. – Aphalaridae, Aphalarinae..... 13
- 13 Vertex with distinct angular anterior lobes which are separated by narrow transverse groove from genae. Clypeus more or less distinctly protruding from lower head surface. – *Aphalara*..... 14
- Vertex with weakly developed anterior lobes, smoothly passing into genae. Clypeus short, pressed against lower head surface, not strongly protruding from genae. – *Craspedolepta* 24
- 14 Forewing with dark pattern consisting of well-defined spots or patches. Apical dilatation of aedeagus with large dorso-apical membranous sack. Circumanal ring of female proctiger never expanded caudally 15
- Forewing without well-defined dark pattern but sometimes infusate. Apical dilatation of aedeagus without or with small dorso-apical membranous sack. Circumanal ring on female proctiger usually expanded caudally (exceptions *A. longicaudata*, *A. purpurascens*) 17

15	Clypeus long, clearly visible from above; cylindrical, constricted subapically. Forewing narrow, with dark patches concentrated in apical third, basal half clear. On <i>Polygonum</i>	<i>Aphalara maculipennis</i>
–	Clypeus short, not or hardly visible from above; conical, apically blunt or subacute. Forewing broad, with dark patches extending also into basal half	16
16	Surface spinules of forewing forming short rows of 2-4 spinules (Fig. 15). Paramere produced apico-posteriorly (Fig. 17). On <i>Rumex</i>	<i>Aphalara exilis</i>
–	Surface spinules of forewing forming longer rows (Fig. 16). Paramere not produced apico-posteriorly (Fig. 18). On <i>Rumex</i>	<i>Aphalara ulicis</i>
17	Head and thorax dark brown or black. On <i>Stellaria graminea</i>	<i>Aphalara affinis</i>
–	Head and thorax ochreous with orange or brownish markings	18
18	Forewing with surface spinules arranged in irregular, transverse rows (Figs 19, 22-23).....	19
–	Surface spinules of forewing arranged in irregular squares or rhombi (Figs 24-26)	22
19	Paramere with posterior extension apically (Fig. 20). Female terminalia long (Fig. 21). On <i>Polygonum bistorta</i> ..	<i>Aphalara longicaudata</i>
–	Paramere not extended postero-apically. Female terminalia shorter.....	20
20	Body dimensions large (length from head to apex of forewing when folded over body ≥ 2.9 mm). Forewing membrane amber-coloured, surface spinules arranged in very dense, transverse rows (Fig. 22). On <i>Caltha</i>	<i>Aphalara calthae</i>
–	Body dimensions small (≤ 3.2 mm). Forewing membrane colourless or fumose, surface spinules arranged in sparse rows (Fig. 23)	21
21	Circumanal ring caudally consisting of several rows of pores. On <i>Polygonum</i> , <i>Rumex</i>	<i>Aphalara polygoni</i>
–	Circumanal ring caudally consisting of two rows of pores. On <i>Rumex</i>	<i>Aphalara purpurascens</i>
22	Male paramere with anterior finger-like process situated subapically (Fig. 27). Aedeagus as in Fig. 28. Female terminalia as in Fig. 29. On <i>Polygonum</i>	<i>Aphalara borealis</i>
–	Male paramere with anterior finger-like process situated close to apex (Figs 30, 33). Aedeagus as in Figs 31, 34. Female terminalia as in Figs 32, 35.....	23
23	Tip of distal portion of aedeagus directed in an angle of about 30° to longitudinal axis of segment (Fig. 31). On <i>Polygonum aviculare</i> group.....	<i>Aphalara avicularis</i>
–	Tip of distal portion of aedeagus directed in an angle of about 90° to longitudinal axis of segment (Fig. 34). On <i>Polygonum</i>	<i>Aphalara freji</i>
24	Forewing with pattern consisting of well-defined, dark spots of 10-30 μm diameter.....	25
–	Forewing without pattern, or with pattern consisting of dark bands, or membrane irregularly infuscate	29
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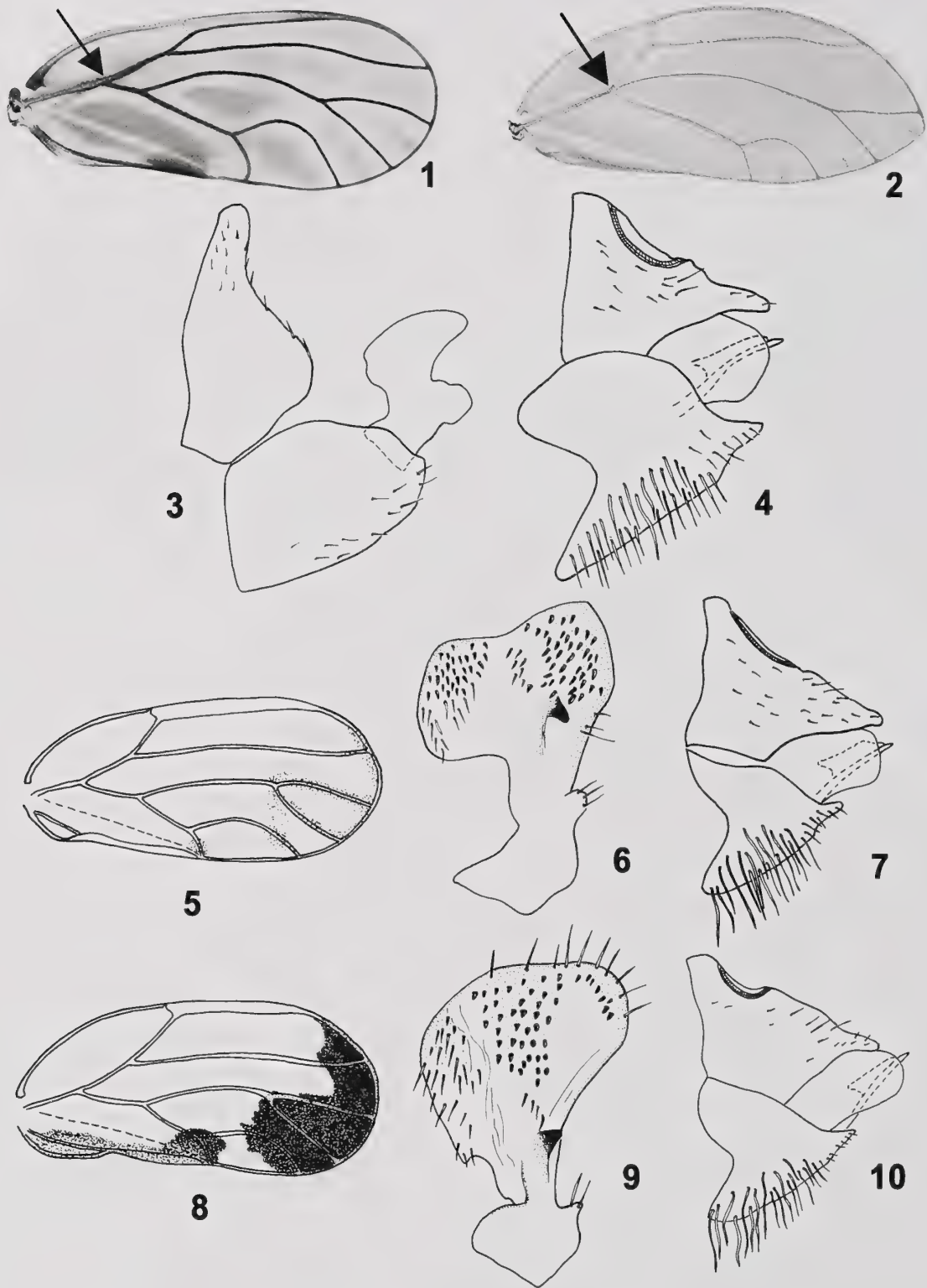
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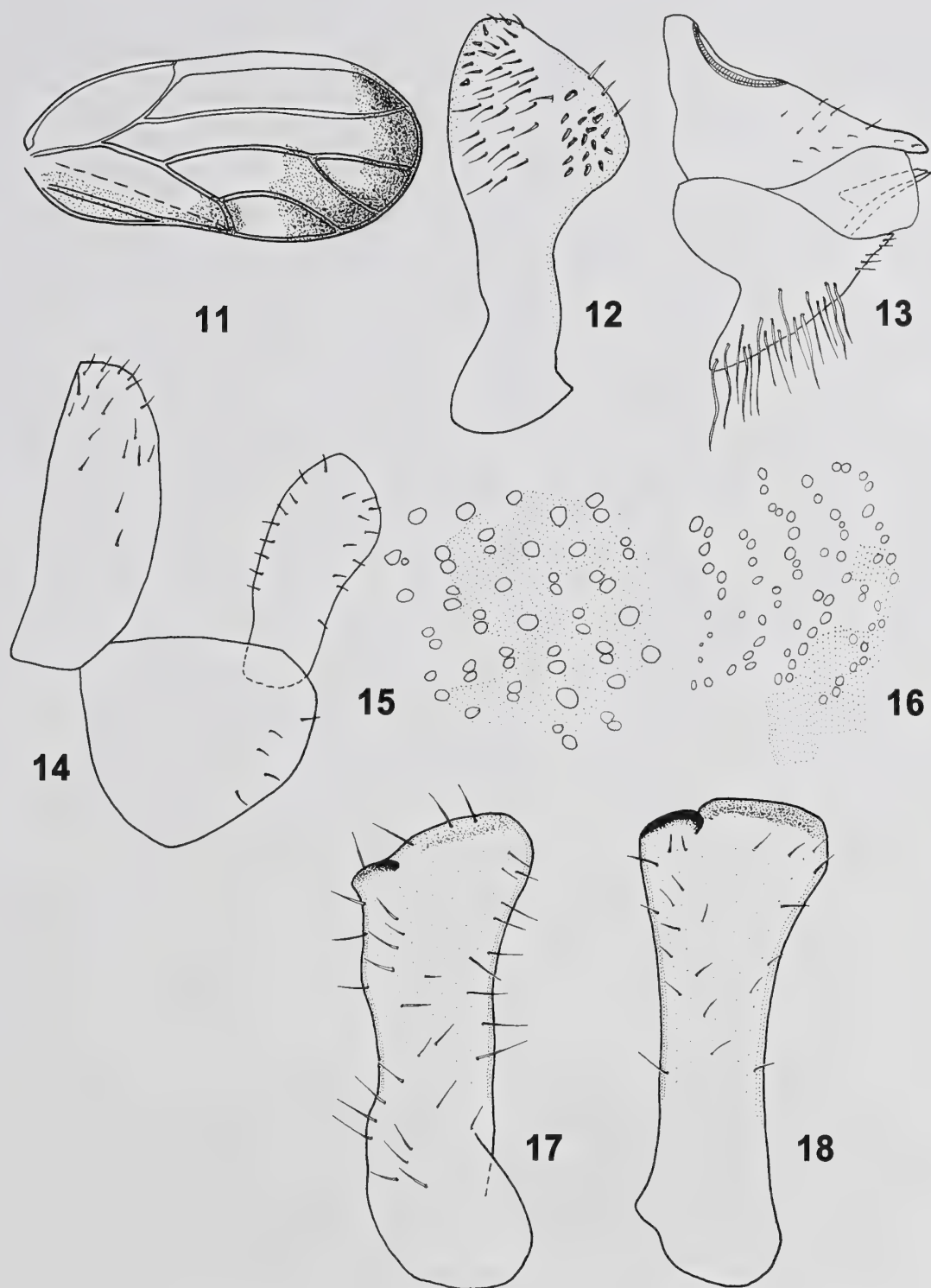
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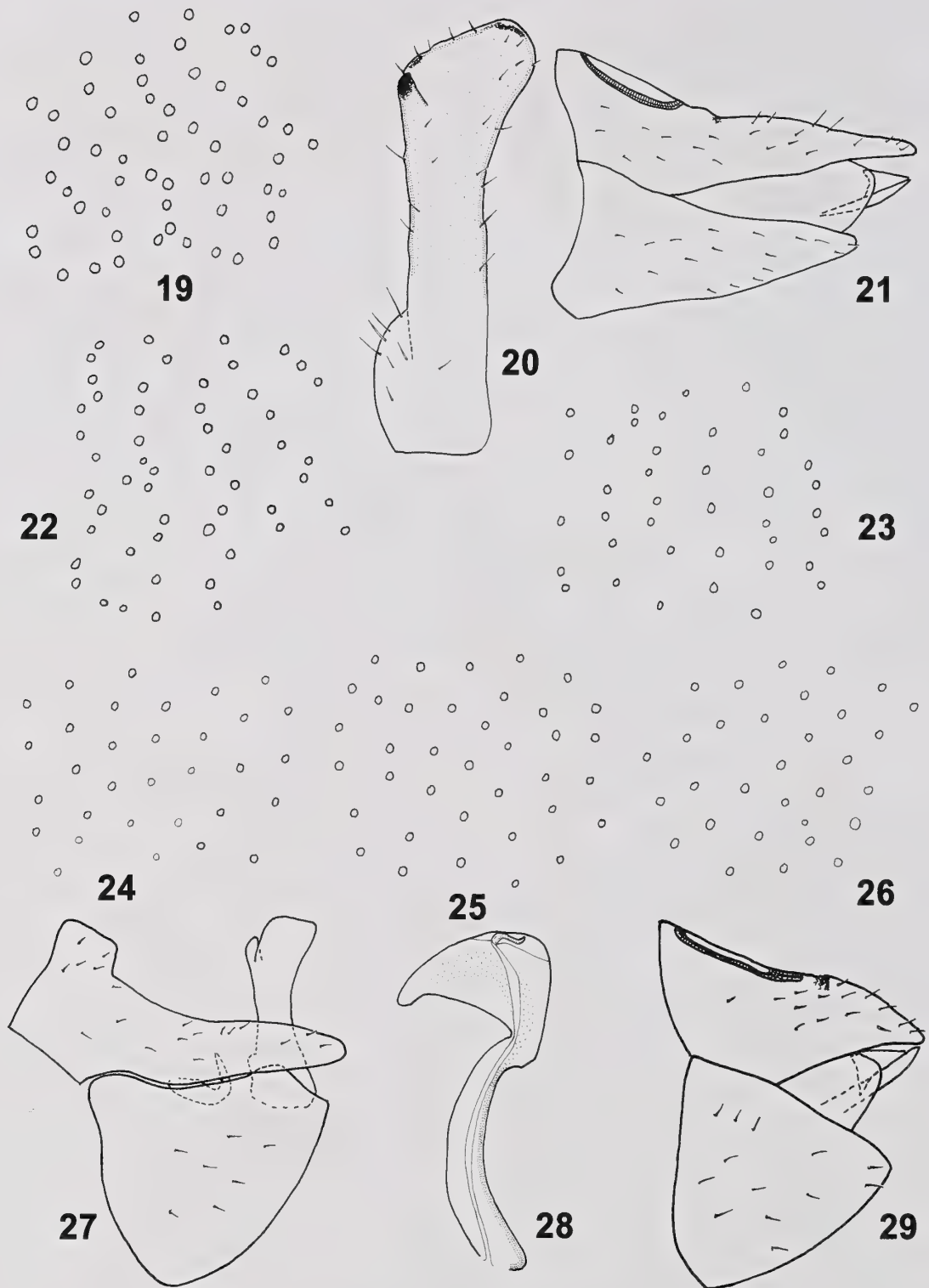
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- 115 Antennal segments 4-7 dark 116
- Antennal segments 4-7 light..... 117
- 116 Surface spinules entirely covering cell r_1 of forewing. Abdominal venter whitish, distinctly lighter than dorsum. Male paramere, in profile, sinuous with wide base and slender apex (Fig. 124). Ventral margin of female subgenital plate straight or concave subapically. On *Salix*. ***Bactericera albiventris***
- Surface spinules of forewing present only in basal half of cell r_1 . Abdominal venter not whitish, or the same colour as dorsum. Male paramere, in profile, straight, with mostly subparal margins (Fig. 125). Ventral margin of female subgenital plate straight or convex subapically. On *Salix*. ***Bactericera salicivora***
- 117 Surface spinules in apical half of forewing covering the whole surface up to the veins; wing angular apically (Fig. 2). Terminalia as in Figs 126-127. On *Comarum palustre* ***Bactericera acutipennis***
- Surface spinules leaving spinule-free stripes along veins of forewing 118
- 118 Antennal segments 4 and 6 with each a group of rhinaria, therefore strongly dilated apically. Terminalia as in Figs 128-129. On *Alchemilla*..... ***Bactericera femoralis***
- Antennal segments 4 and 6 with each 1 rhinarium, not strongly dilated apically..... 119
- 119 Surface spinules of forewing also present in distal half of cell r_1 and entirely covering cell $c+sc$. On *Potentilla anserina* ***Bactericera reuteri***
- Surface spinules of forewing present only in proximal half of cell r_1 and strongly reduced in cell $c+sc$. On *Geum* ***Bactericera bohémica***
- 120 Genal processes at most as long as two thirds of vertex. Antenna entirely dark brown to black. Terminalia as in Figs 130-131. Polyphagous on dicotyledonous herbs ***Bactericera nigricornis***
- Genal processes about as long as vertex. At least antennal segment 3 light 121
- 121 Antenna completely black. On *Artemisia*..... ***Bactericera calcarata***
- At least antennal segment 3 light..... 122
- 122 Antennal segments 3-5 partly or entirely light. On *Sanguisorba* ***Bactericera modesta***
- Antennal segment 3 light, 4 and 5 dark..... 123
- 123 Forewing widest in the middle. On *Berberis vulgaris*..... ***Trioza scottii***
- Forewing widest in apical thirds. On *Salix*..... 124
- 124 Forewing with vein A entirely dark ***Bactericera curvatinervis***
- Dark colour on vein A of forewing reduced to a spot..... 125
- 125 Dark spot on vein A of forewing distinct. Male paramere, in profile, more or less straight with large anteriorly directed tooth (Fig. 132). Female proctiger short with apical two thirds of dorsal outline strongly convex ***Bactericera striola***
- Dark spot on vein A of forewing indistinct. Male paramere sickle-shaped or with small apical hook. Female proctiger longer with apical two thirds of dorsal outline straight or concave 126
- 126 Male parameres, in profile, sickle-shaped. Female subgenital plate long with indistinct, long apical process ***Bactericera substriola***
- Male parameres, in profile, straight, lamellar, with small apical tooth. Female subgenital plate short with distinct short apical process..... ***Bactericera parastriola***



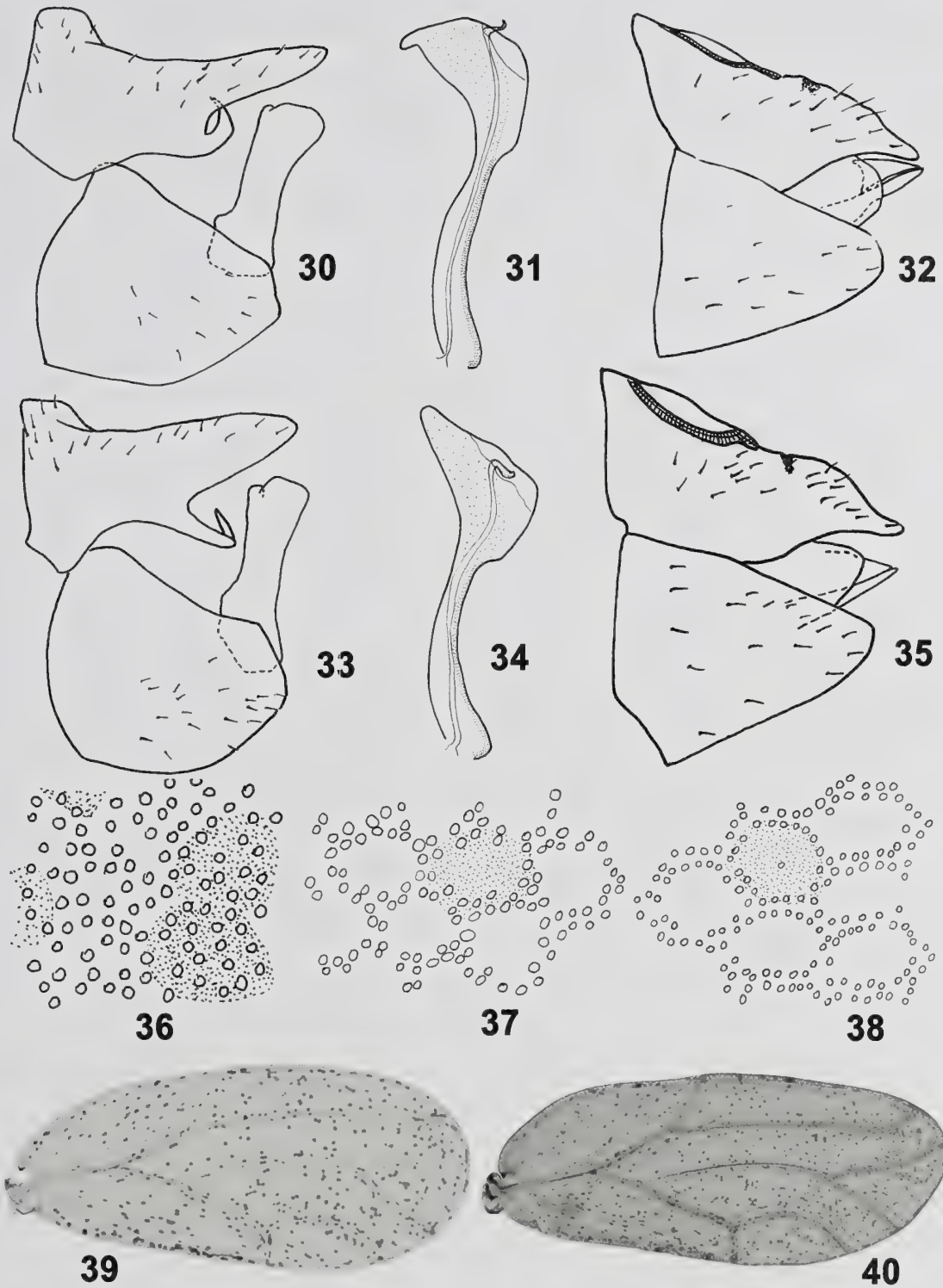
Figs 1-10. (1) *Cacopsylla pyricola*, forewing. (2) *Bactericera acutipennis*, forewing. (3) *Psyllopsis fraxinicola*, male terminalia. (4) *Psyllopsis fraxinicola*, female terminalia. (5) *Psyllopsis discrepans*, forewing. (6) *Psyllopsis discrepans*, paramere. (7) *Psyllopsis discrepans*, female terminalia. (8) *Psyllopsis distinguenda*, forewing. (9) *Psyllopsis distinguenda*, paramere. (10) *Psyllopsis distinguenda*, female terminalia.



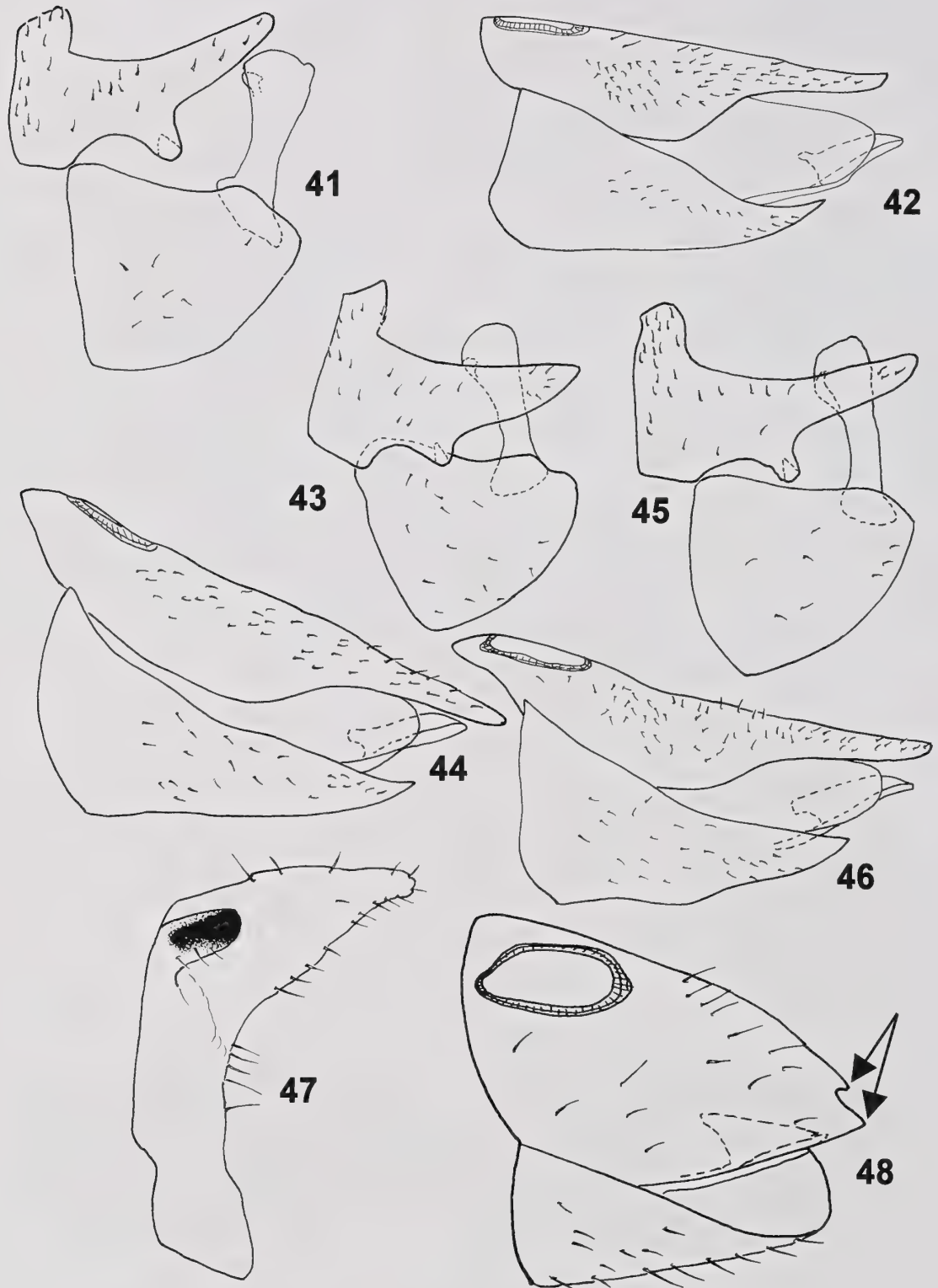
Figs 11-18. (11) *Psyllopsis fraxini*, forewing. (12) *Psyllopsis fraxini*, paramere. (13) *Psyllopsis fraxini*, female terminalia. (14) *Strophingia ericae*, male terminalia. (15) *Aphalara exilis*, forewing surface spinules. (16) *Aphalara ulicis*, forewing surface spinules. (17) *Aphalara exilis*, paramere. (18) *Aphalara ulicis*, paramere.



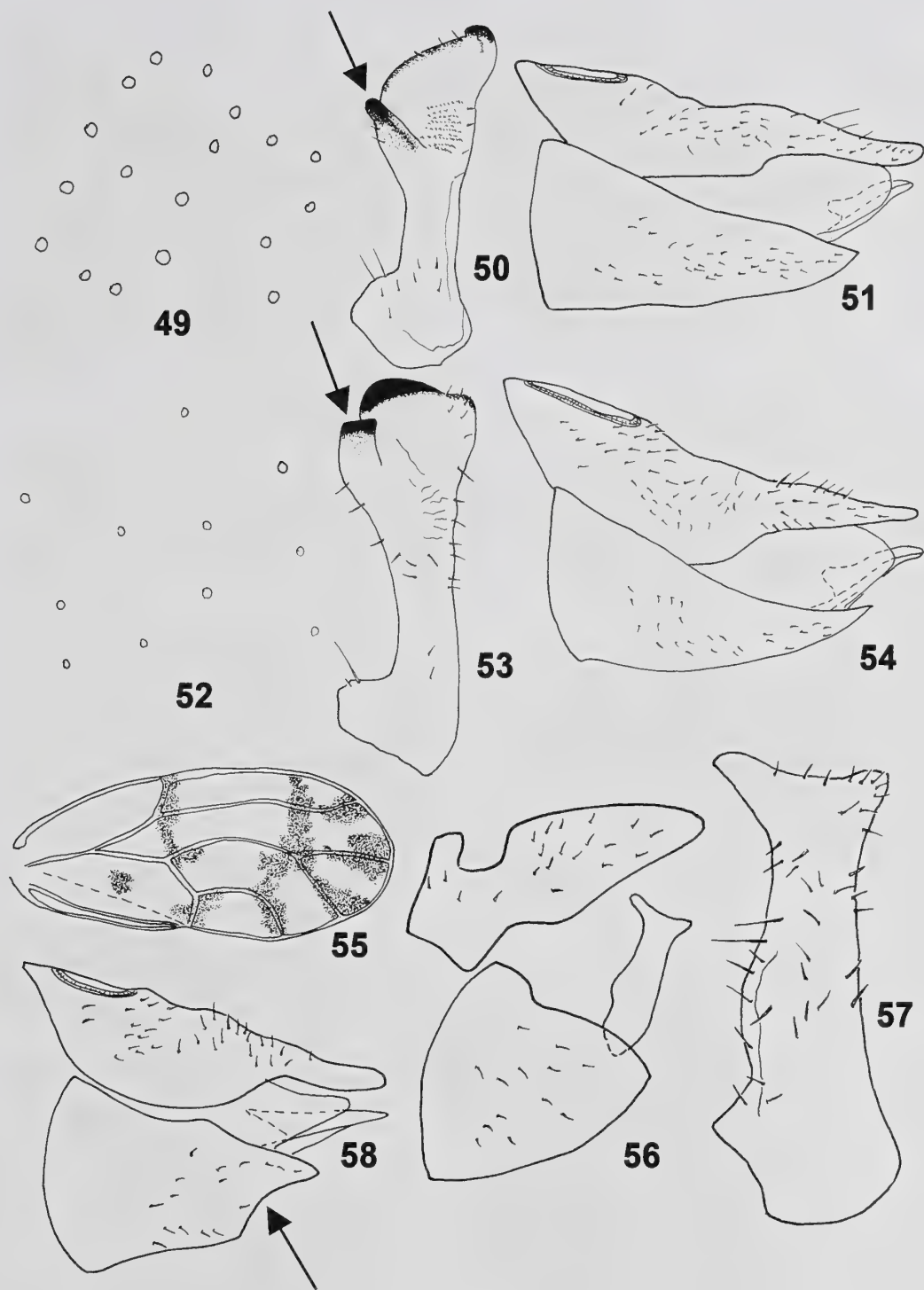
Figs 19-29. (19) *Aphalara longicaudata*, forewing surface spinules. (20) *Aphalara longicaudata*, paramere. (21) *Aphalara longicaudata*, female terminalia. (22) *Aphalara calthae*, forewing surface spinules. (23) *Aphalara polygoni*, forewing surface spinules. (24) *Aphalara borealis*, forewing surface spinules. (25) *Aphalara avicularis*, forewing surface spinules. (26) *Aphalara freji*, forewing surface spinules. (27) *Aphalara borealis*, male terminalia. (28) *Aphalara borealis*, aedeagus. (29) *Aphalara borealis*, female terminalia.



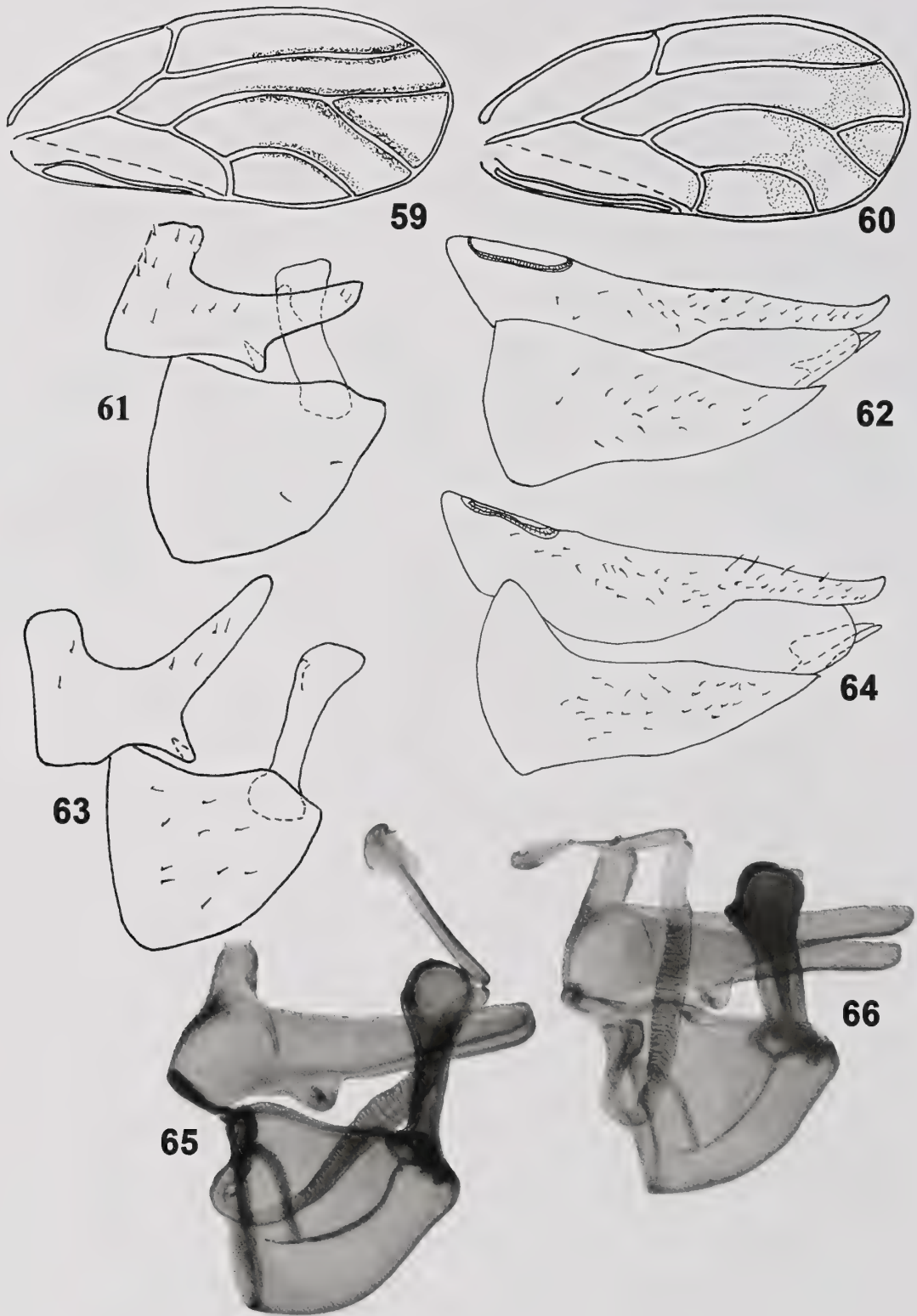
Figs 30-40. (30) *Aphalara avicularis*, male terminalia. (31) *Aphalara avicularis*, aedeagus. (32) *Aphalara avicularis*, female terminalia. (33) *Aphalara freji*, male terminalia. (34) *Aphalara freji*, aedeagus. (35) *Aphalara freji*, female terminalia. (36) *Craspedolepta artemisiae*, forewing surface spinules. (37) *Craspedolepta latior*, forewing surface spinules. (38) *Craspedolepta malachitica*, forewing surface spinules. (39) *Craspedolepta latior*, forewing. (40) *Craspedolepta malachitica*, forewing.



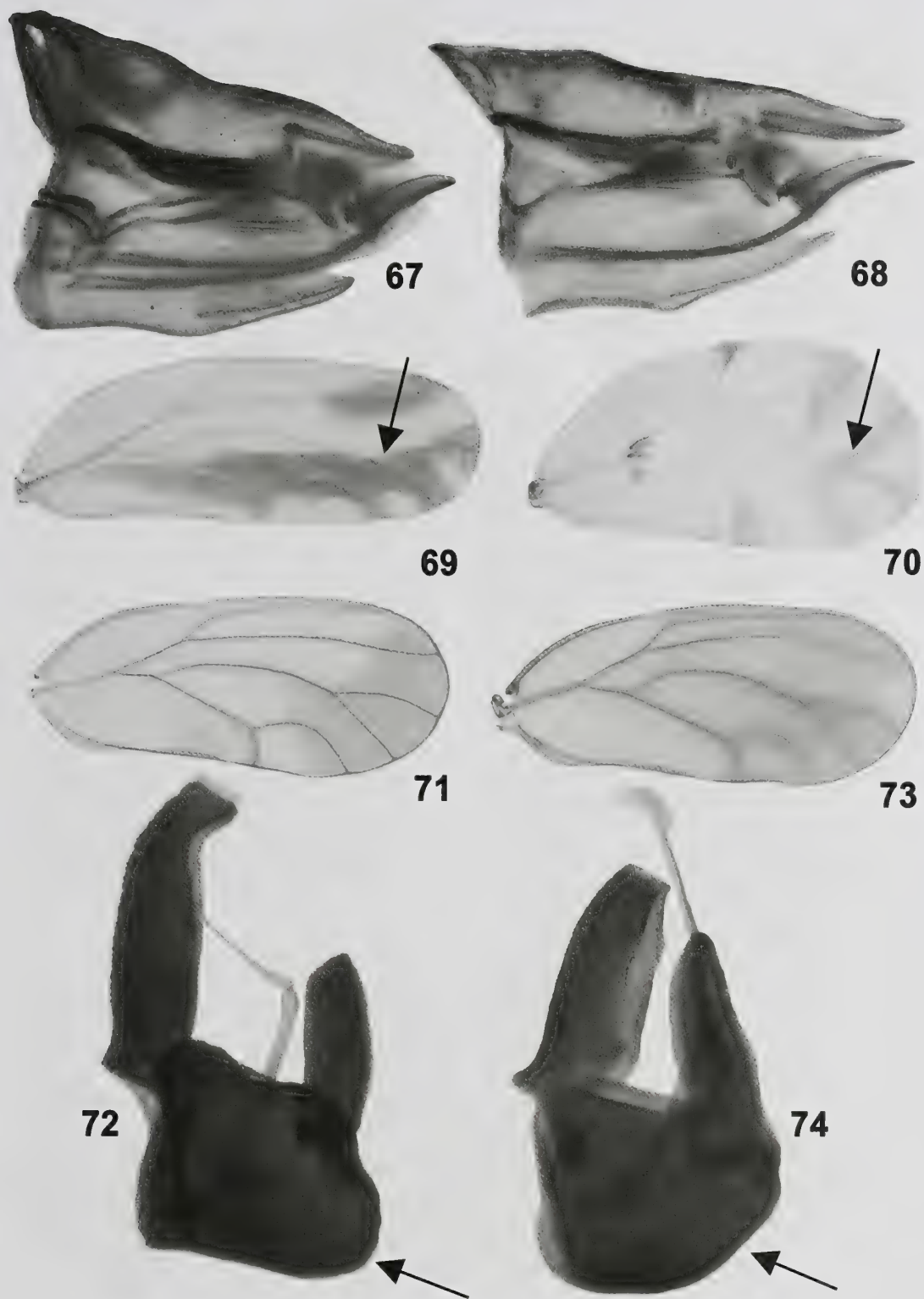
Figs 41-48. (41) *Craspedolepta artemisiae*, male terminalia. (42) *Craspedolepta artemisiae*, female terminalia. (43) *Craspedolepta latior*, male terminalia. (44) *Craspedolepta latior*, female terminalia. (45) *Craspedolepta malachitica*, male terminalia. (46) *Craspedolepta malachitica*, female terminalia. (47) *Craspedolepta subpunctata*, paramere. (48) *Craspedolepta subpunctata*, female terminalia.



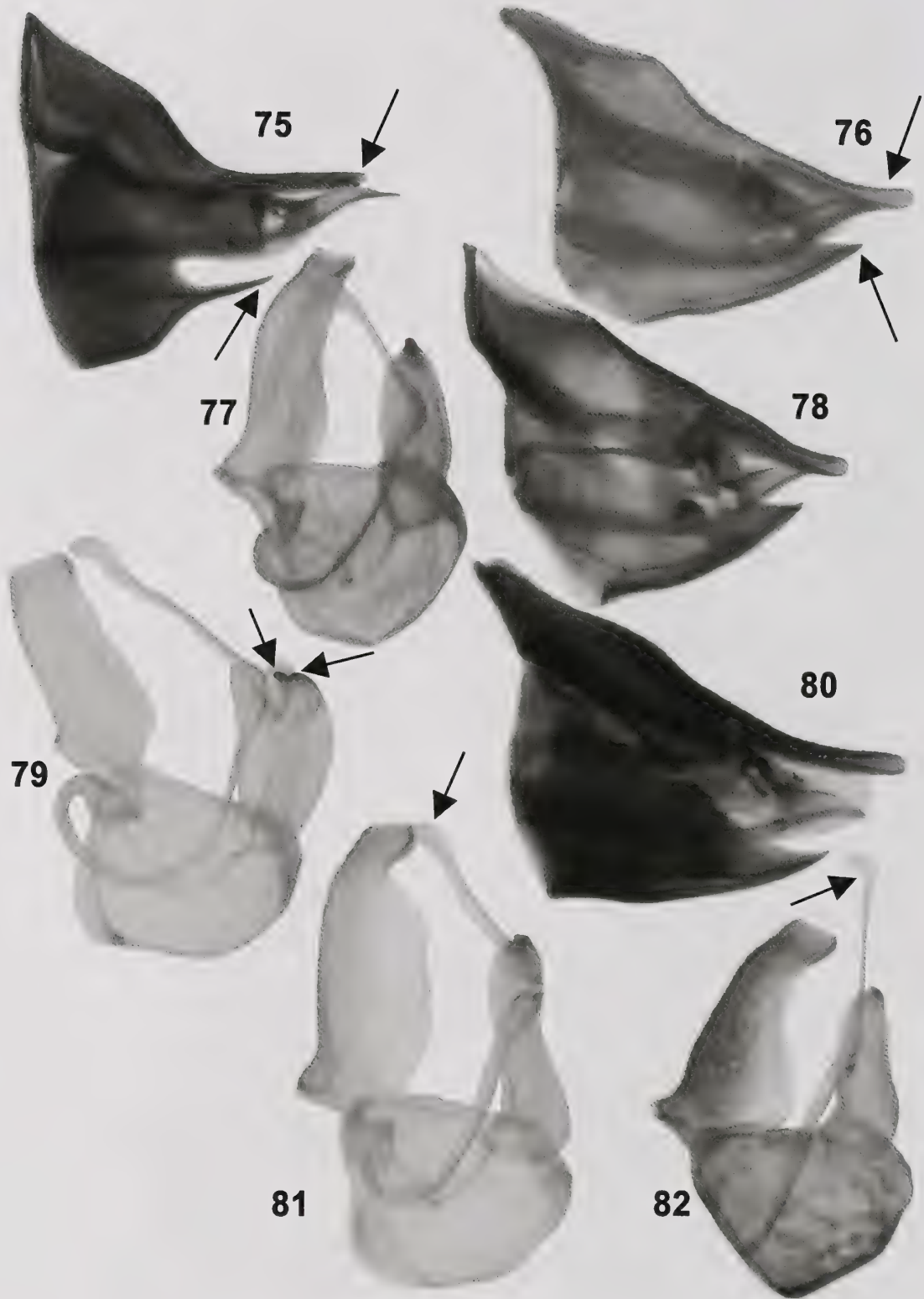
Figs 49-58. (49) *Craspedolepta innoxia*, forewing surface spinules. (50) *Craspedolepta innoxia*, paramere. (51) *Craspedolepta innoxia*, female terminalia. (52) *Craspedolepta omissa*, forewing surface spinules. (53) *Craspedolepta omissa*, paramere. (54) *Craspedolepta omissa*, female terminalia. (55) *Craspedolepta nebulosa*, forewing. (56) *Craspedolepta nebulosa*, male terminalia. (57) *Craspedolepta nebulosa*, paramere. (58) *Craspedolepta nebulosa*, female terminalia.



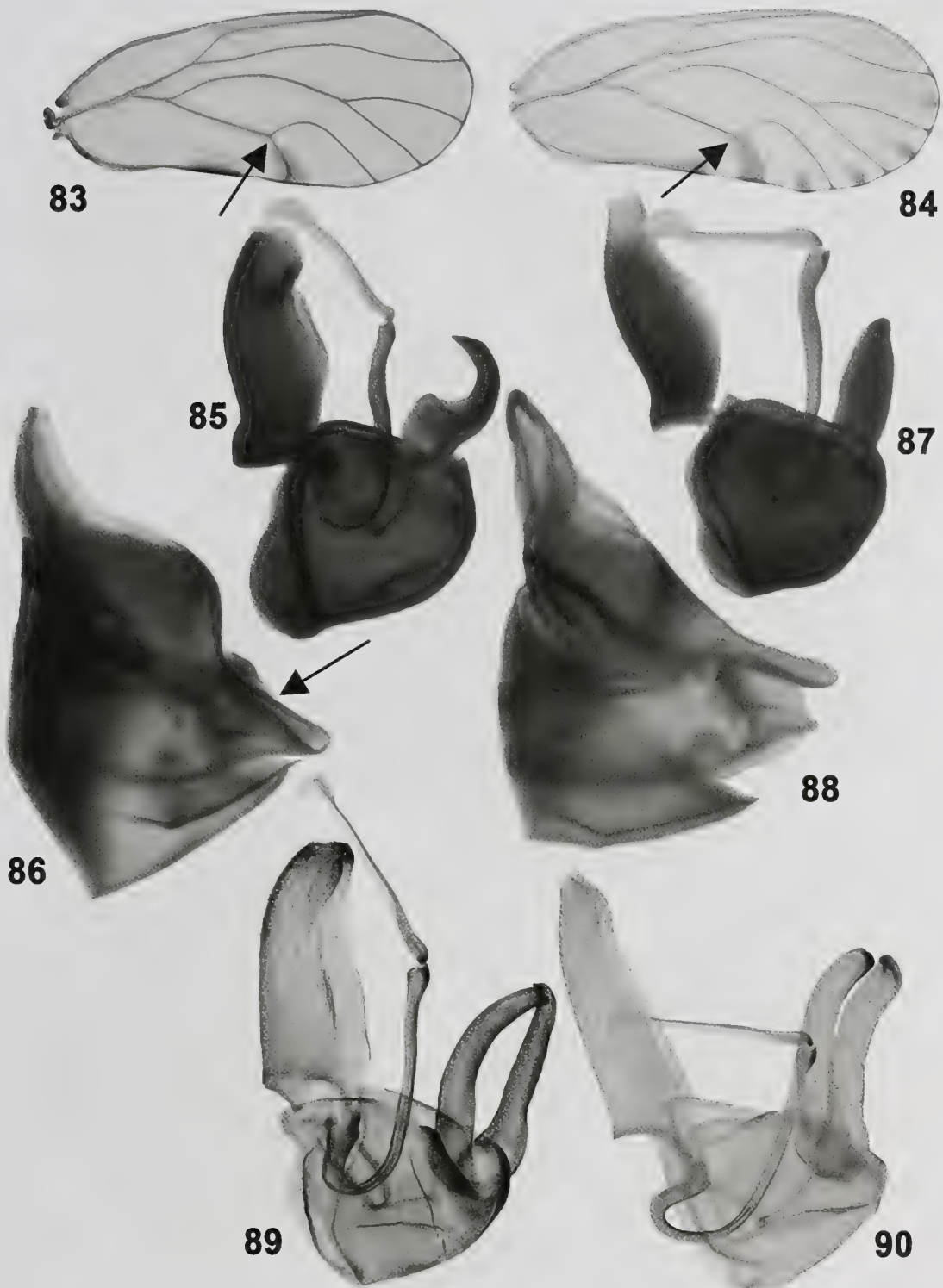
Figs 59-66. (59) *Craspedolepta nervosa*, forewing. (60) *Craspedolepta bulgarica*, forewing. (61) *Craspedolepta nervosa*, male terminalia. (62) *Craspedolepta nervosa*, female terminalia. (63) *Craspedolepta bulgarica*, male terminalia. (64) *Craspedolepta bulgarica*, female terminalia. (65) *Craspedolepta crispata*, male terminalia. (66) *Craspedolepta sonchi*, male terminalia.



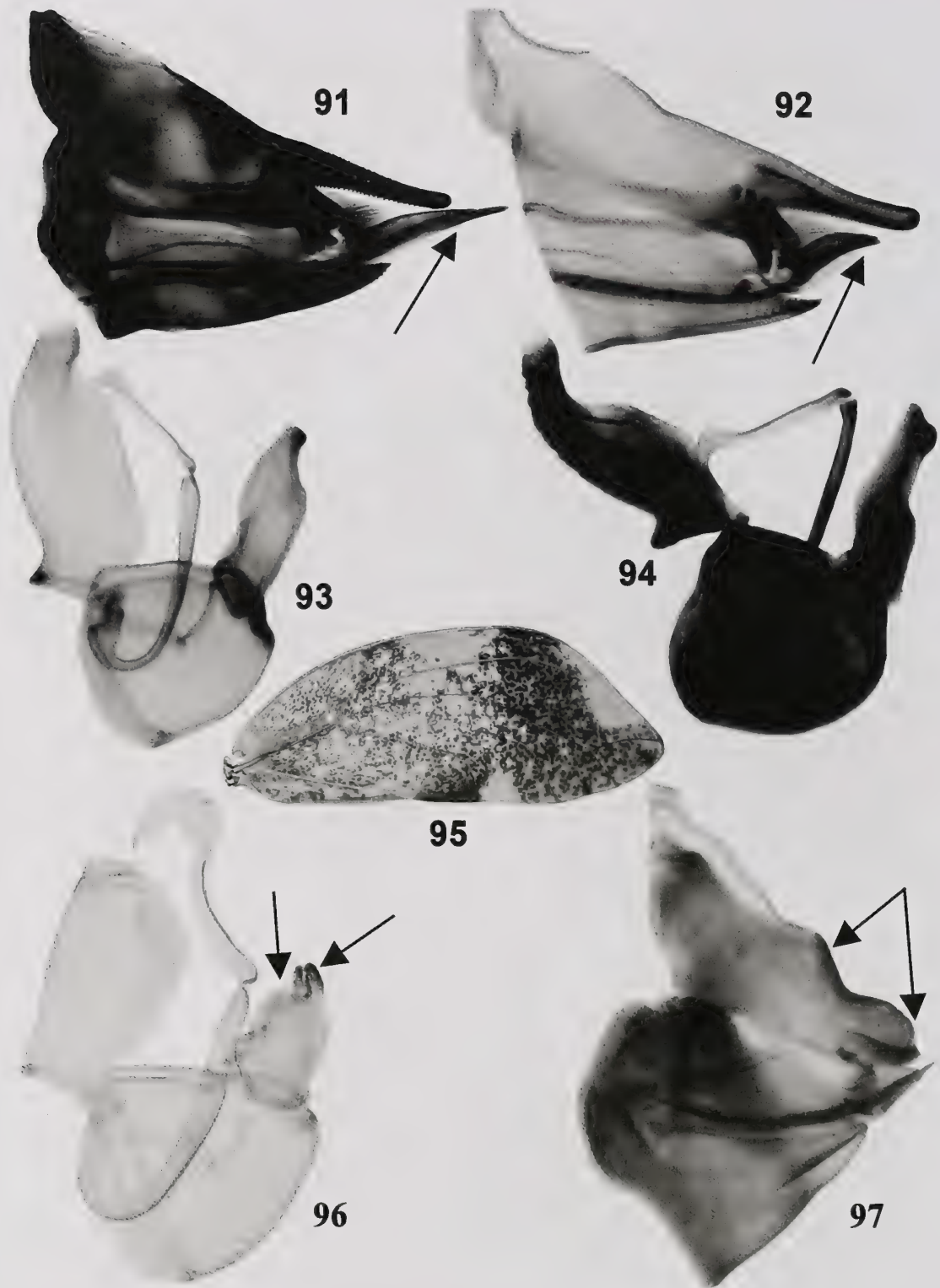
Figs 67-74. (67) *Craspedolepta crispata*, female terminalia. (68) *Craspedolepta sonchi*, female terminalia. (69) *Livilla horvathi*, forewing. (70) *Livilla radiata*, forewing. (71) *Cacopsylla breviantennata*, forewing. (72) *Cacopsylla breviantennata*, male terminalia. (73) *Cacopsylla pruni*, forewing. (74) *Cacopsylla pruni*, male terminalia.



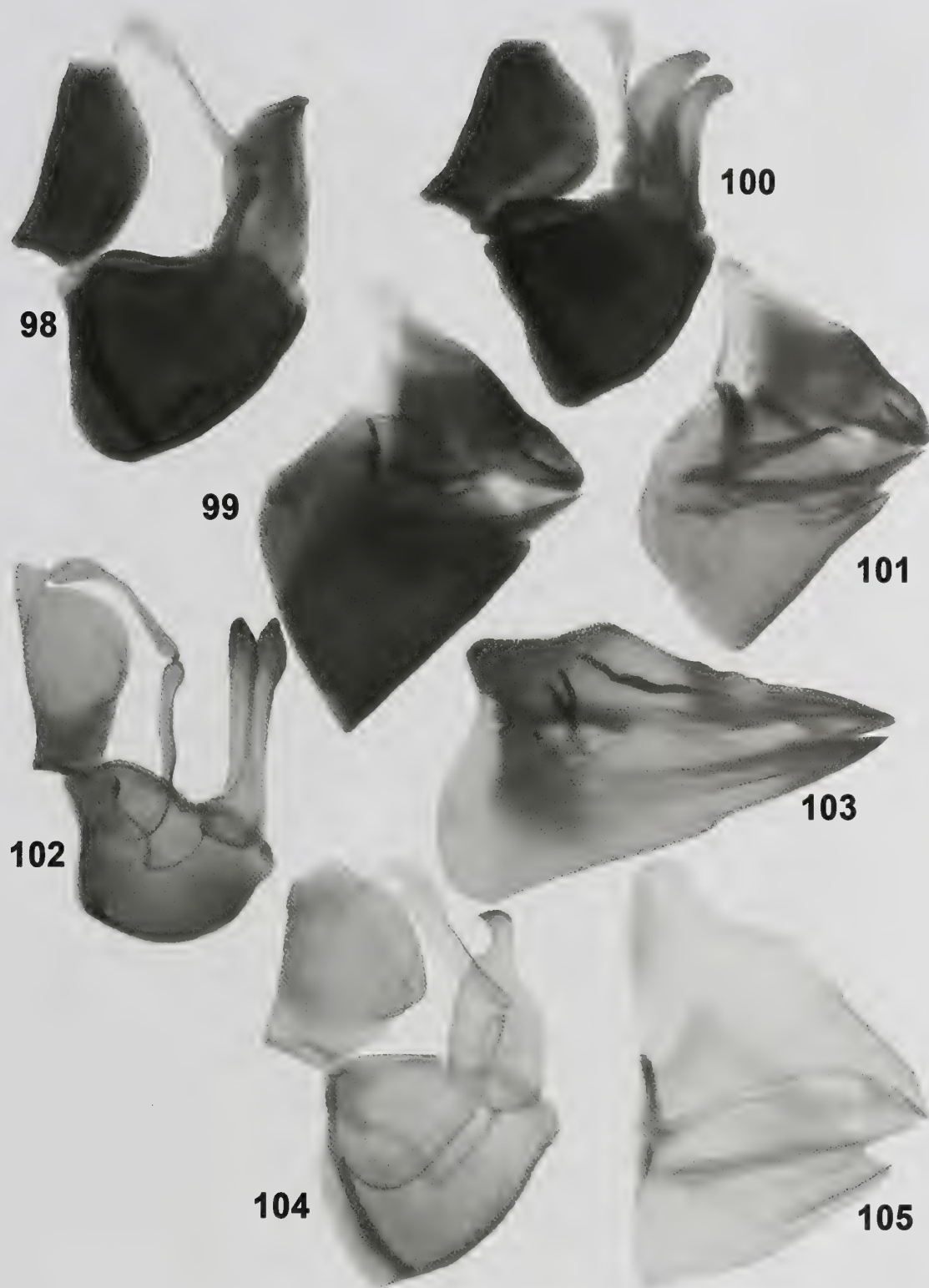
Figs 75-82. (75) *Cacopsylla breviantennata*, female terminalia. (76) *Cacopsylla pruni*, female terminalia. (77) *Cacopsylla pyrisuga*, male terminalia. (78) *Cacopsylla pyrisuga*, female terminalia. (79) *Cacopsylla picta*, male terminalia. (80) *Cacopsylla picta*, female terminalia. (81) *Cacopsylla melanoneura*, male terminalia. (82) *Cacopsylla affinis*, male terminalia.



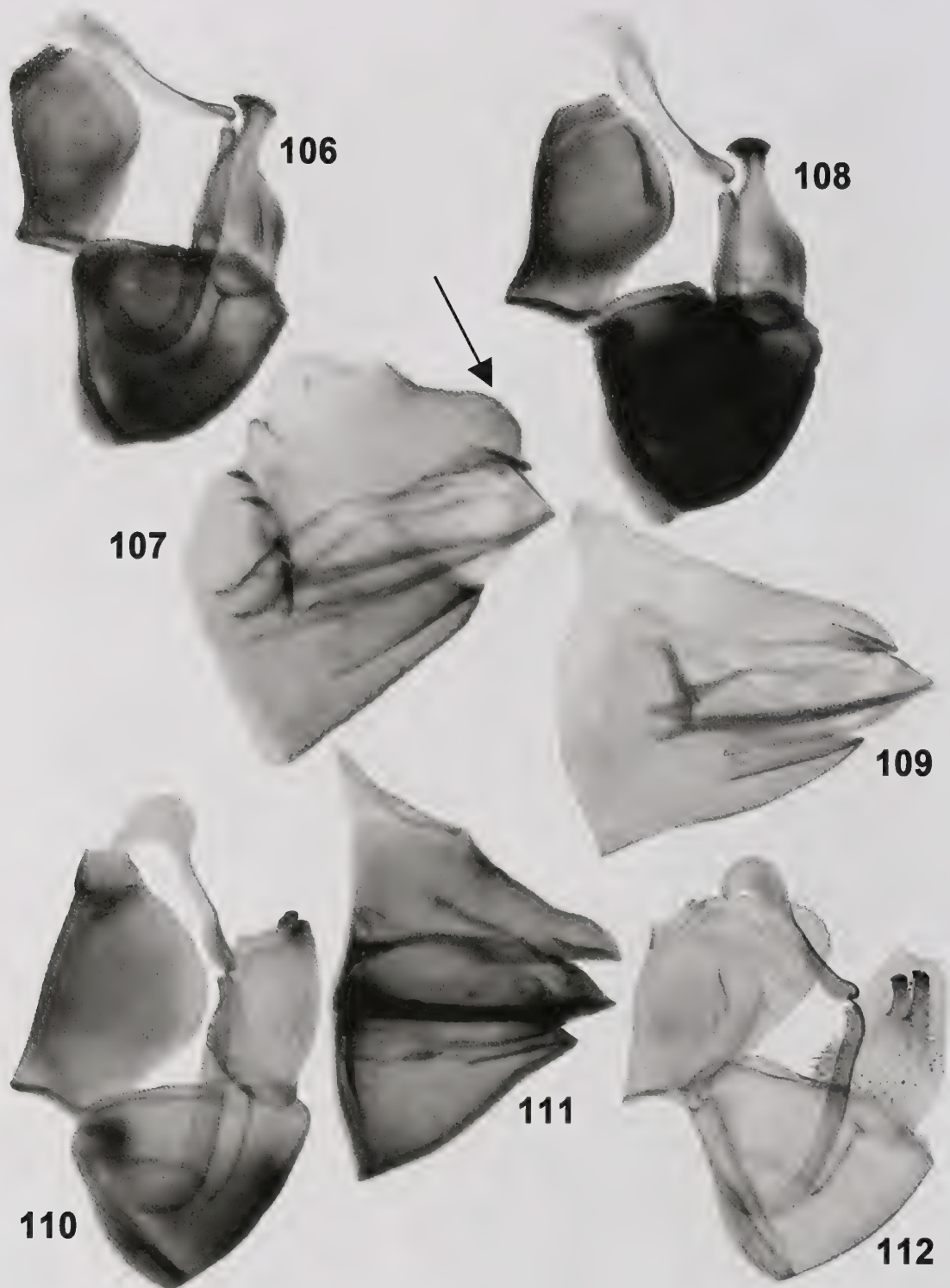
Figs 83-90. (83) *Cacopsylla albipes*, forewing. (84) *Cacopsylla crataegi*, forewing. (85) *Cacopsylla pyri*, male terminalia. (86) *Cacopsylla pyri*, female terminalia. (87) *Cacopsylla pyricola*, male terminalia. (88) *Cacopsylla pyricola*, female terminalia. (89) *Cacopsylla zetterstedti*, male terminalia. (90) *Cacopsylla hippophaes*, male terminalia.



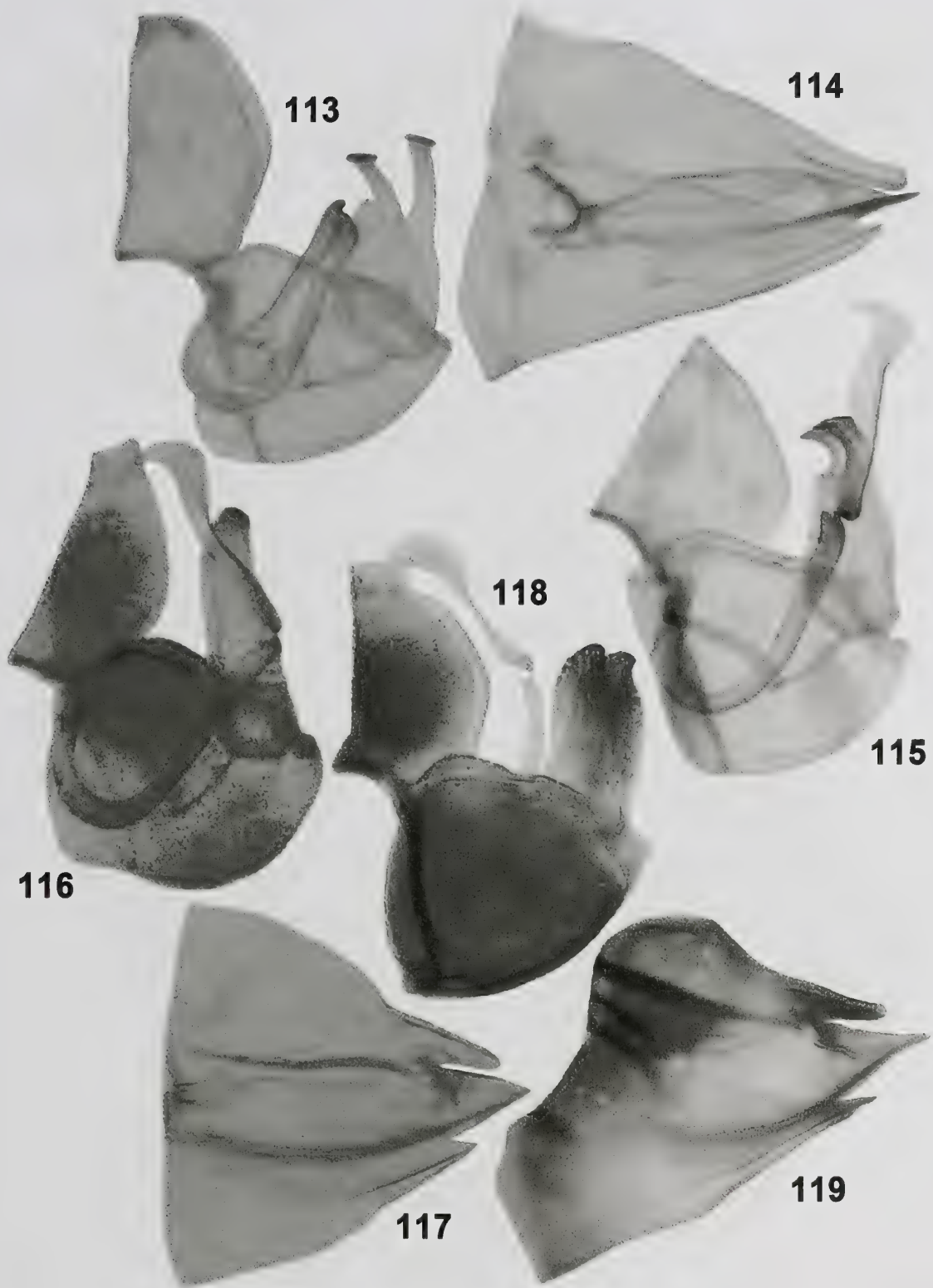
Figs 91-97. (91) *Cacopsylla zetterstedti*, female terminalia. (92) *Cacopsylla hippophaes*, female terminalia. (93) *Cacopsylla brunneipennis*, male terminalia. (94) *Cacopsylla nigrita*, male terminalia. (95) *Trichohermes walkeri*, forewing. (96) *Trioza centeranthi*, male terminalia. (97) *Trioza centeranthi*, female terminalia.



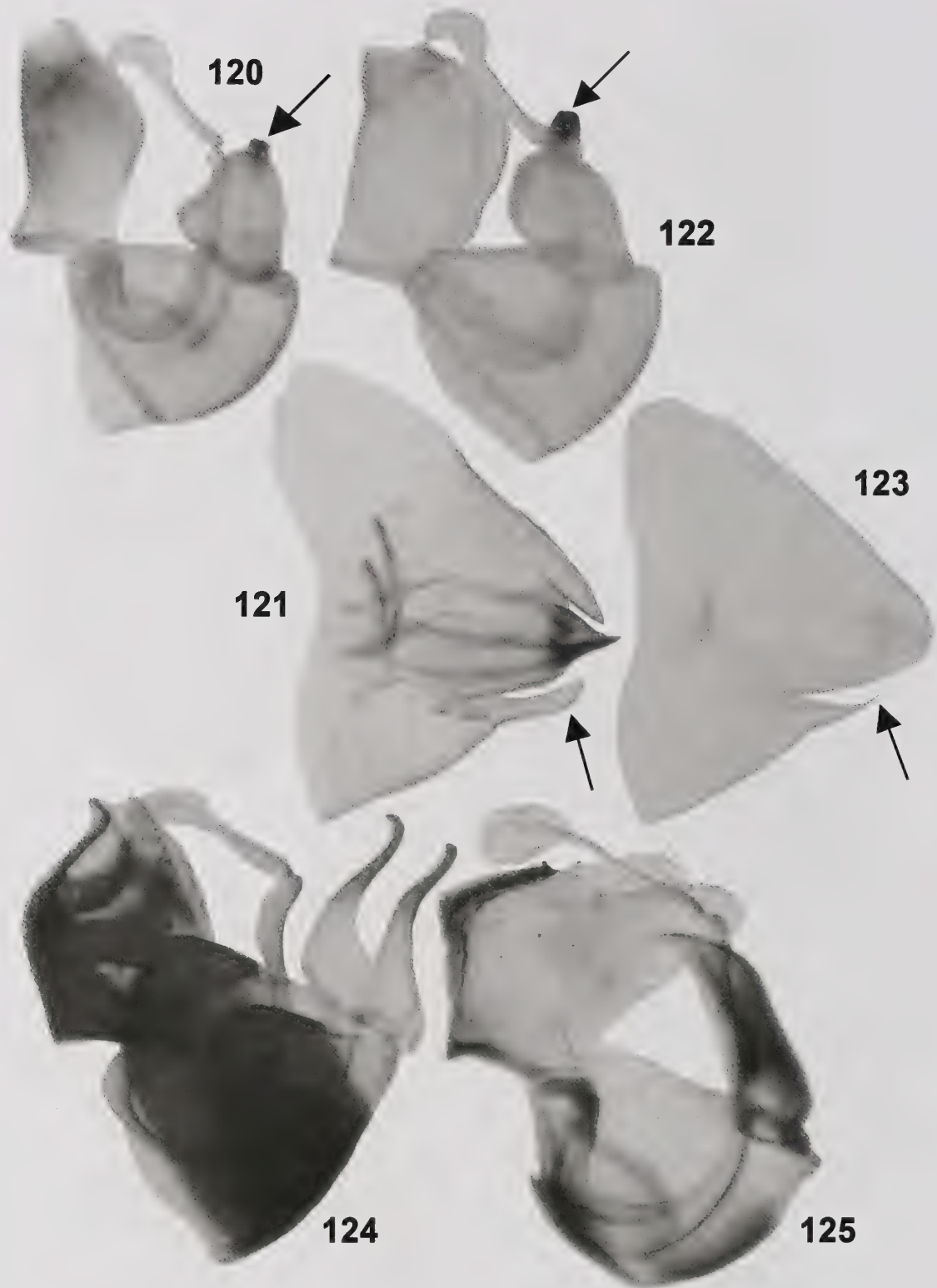
Figs 98-105. (98) *Trioza galii*, male terminalia. (99) *Trioza galii*, female terminalia. (100) *Trioza velutina*, male terminalia. (101) *Trioza velutina*, female terminalia. (102) *Trioza urticae*, male terminalia. (103) *Trioza urticae*, female terminalia. (104) *Trioza proxima*, male terminalia. (105) *Trioza proxima*, female terminalia.



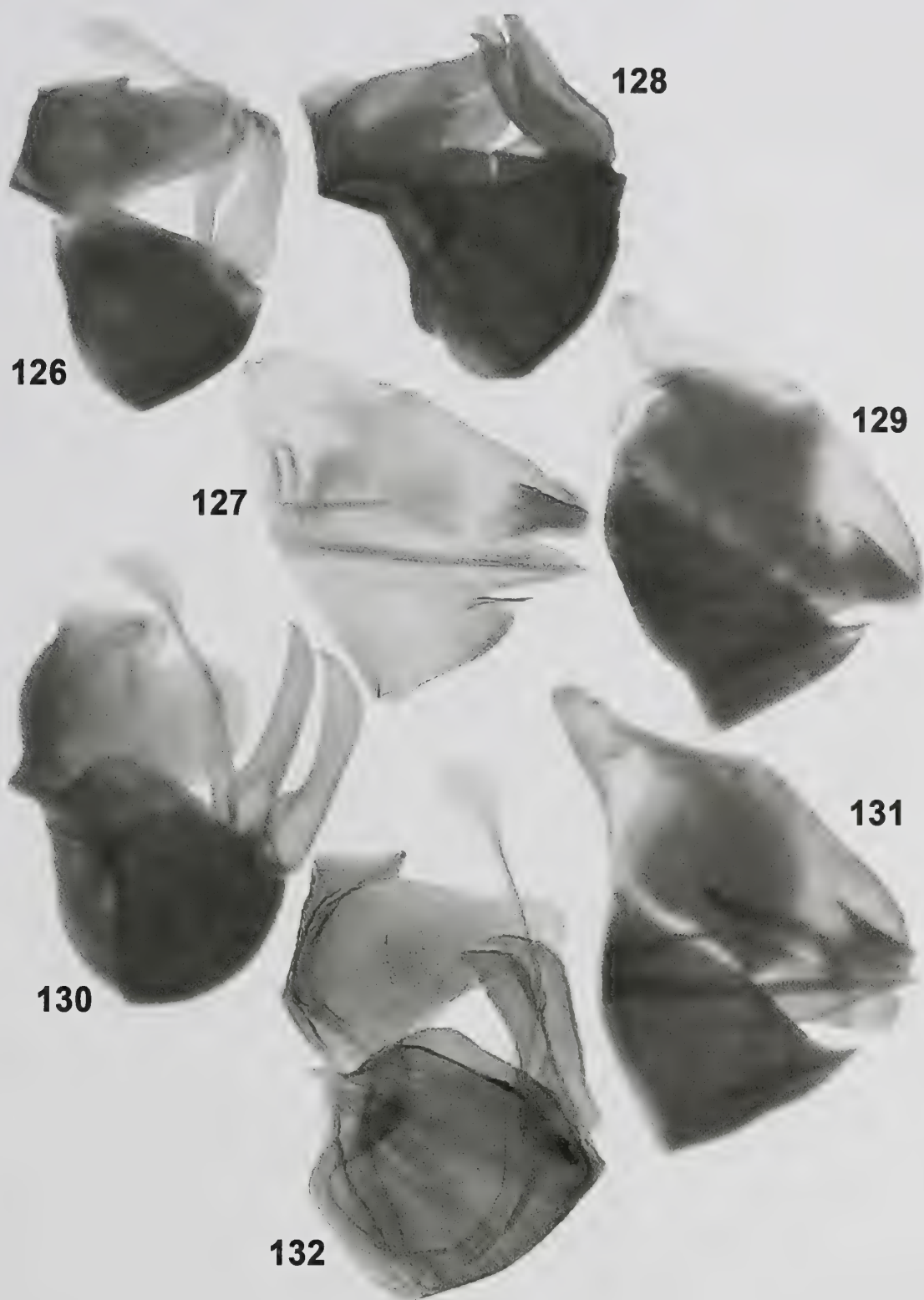
Figs 106-112. (106) *Trioza dispar*, male terminalia. (107) *Trioza dispar*, female terminalia. (108) *Trioza tatrensis*, male terminalia. (109) *Trioza tatrensis*, female terminalia. (110) *Trioza rotundata*, male terminalia. (111) *Trioza rotundata*, female terminalia. (112) *Trioza cerastii*, male terminalia.



Figs 113-119. (113) *Trioza cirsii*, male terminalia. (114) *Trioza cirsii*, female terminalia. (115) *Trioza abdominalis*, male terminalia. (116) *Trioza alacris*, male terminalia. (117) *Trioza alacris*, female terminalia. (118) *Trioza remota*, male terminalia. (119) *Trioza remota*, female terminalia.



Figs 120-125. (120) *Trioza anthrisci*, male terminalia. (121) *Trioza anthrisci*, female terminalia. (122) *Trioza laserpitii*, male terminalia. (123) *Trioza laserpitii*, female terminalia. (124) *Bactericera albiventris*, male terminalia. (125) *Bactericera salicivora*, male terminalia.



Figs 126-132. (126) *Bactericera acutipennis*, male terminalia. (127) *Bactericera acutipennis*, female terminalia. (128) *Bactericera femoralis*, male terminalia. (129) *Bactericera femoralis*, female terminalia. (130) *Bactericera nigricornis*, male terminalia. (131) *Bactericera nigricornis*, female terminalia. (132) *Bactericera striola*, male terminalia.

APPENDIX 2

Species	Belarus	Poland	Northwest Russia	Lithuania	Livonia
Aphalaridae					
Aphalarinae					
<i>Aphalara affinis</i>	1	2	3, 4		27
<i>Aphalara avicularis</i>	1, 3 as <i>A. polygona</i> , see checklist	26			27 p.p. as <i>Aphalara polygona</i>
<i>Aphalara borealis</i>	2				
<i>Aphalara calthae</i>	2	3, 4			
<i>Aphalara exilis</i>	2	3, 4, 5, 6			27
<i>Aphalara freyi</i>	1, 3 as <i>A. polygona</i> , see checklist	2 as <i>Aphalara polygona</i>			27 p.p. as <i>Aphalara polygona</i>
<i>Aphalara maculipennis</i>	2				
<i>Aphalara purpurascens</i>	2 as <i>A. runiticola</i> , 24 as <i>A. crispicola</i>				
<i>Craspedolepia alevinae</i>	2 as <i>C. alevinae smreczynskii</i>				
<i>Craspedolepia artemisiae</i>	2				
<i>Craspedolepia bulgarica</i>	2	4, 5, 7			27 as <i>Aphalara artemisiae</i>
<i>Craspedolepia crispata</i>	1				
<i>Craspedolepia flavipennis</i>	1	2			27 p.p. as <i>Aphalara picta</i>
<i>Craspedolepia laticornis</i>	1	2			4
<i>Craspedolepia malachitica</i>	1	2			4
<i>Craspedolepia nebulosa</i>	2	4			
<i>Craspedolepia nervosa</i>	1	2			4, 5
<i>Craspedolepia omissa</i>	1	2			27 as <i>Aphalara nervosa</i>
<i>Craspedolepia sonchi</i>	2	4			27 p.p. as <i>Aphalara picta</i>
<i>Craspedolepia subpunctata</i>	1	2			4

Psyllids reported from Belarus, Poland, Northwest Russia, Lithuania and the former Livonia. Sources: 1 – species recorded in the present paper; 2 – Klimaszewski (1975); 3 – Logimova (1961); 4 – Logimova (1962b); 5 – Logimova (1968); 6 – Logimova (1972a); 7 – Logimova (1962a); 8 – Logimova (1966); 9 – Logimova (1954); 10 – Petrov *et al.* (2011); 11 – Petrov & Sautkin (2013); 12 – Logimova (1967); 13 – Gortenko *et al.* (1988); 14 – Byzdzienka *et al.* (1973); 15 – Palyakova (1969); 16 – Logimova (1972b); 17 – Petrov (2004); 18 – Sidlyarevich & Bolomikova (1992); 19 – Kuznetsova *et al.* (2012); 20 – Malumphy *et al.* (2009); 21 – Vengelianskaite (1974); 22 – Glowacka (1989); 23 – Glowacka (1991); 24 – Glowacka & Migula (1996); 25 – Drohojowska & Glowacka (2011); 26 – Ossianilsson (1992); 27 – Flor (1861); 28 – Petrov (2011).

Species	Belarus	Poland	Northwest Russia	Lithuania	Livonia
Rhinocolinae					
<i>Rhinocola aceris</i>	1	2	4, 5		27
Liviidae					
Euphyllurinae					
<i>Psyllopsis discrepans</i>	1	2		20	
<i>Psyllopsis distinguenda</i>	1	2			
<i>Psyllopsis fraxini</i>	28	2	4, 9		27 as <i>Psylla fraxini</i>
<i>Psyllopsis fraxinicola</i>	1	2	9	20	27 as <i>Psylla unicolor</i>
<i>Strophingia ericae</i>	1	2 as <i>Aphalaroida ericae</i>	4		27 as <i>Rhinocola ericae</i>
Liviinae					
<i>Camarotoscena speciosa</i>	1	2			27 as <i>Rhinocola speciosa</i>
<i>Livia crefeldensis</i>	2 as <i>Diraphia crefeldensis</i>				27 as <i>Livia crefeldensis</i>
<i>Livia junci</i>	2 as <i>Livia juncorum</i>	4, 8 as <i>Livia juncorum</i>		27 as <i>Livia juncorum</i>	
<i>Livia limbata</i>	2 as <i>Diraphia limbata</i>				
Psyllidae					
Psyllinae					
<i>Arytaina genistae</i>	1	2			
<i>Arytainilla spartiophila</i>			20		
<i>Baeopelma foersteri</i>	1, 4 as <i>Psylla foersteri</i>	2 as <i>Psylla foersteri</i>	4 as <i>Psylla foersteri</i>		27 as <i>Psylla foersteri</i>
<i>Cacopsylla abdominalis</i>	2				
<i>Cacopsylla albipes</i>	2				
<i>Cacopsylla ambigua</i>	1	2	4, 5, 8, 12 as <i>Psylla ambigua</i>		27 as <i>Psylla melina</i>
<i>Cacopsylla brunneipennis</i>		1	2 as <i>Cacopsylla klapaleki</i>		
<i>Cacopsylla crataegi</i>	11, 13	2			
<i>Cacopsylla elegantula</i>	2				
<i>Cacopsylla flori</i>	2			27 as <i>Psylla insignis</i>	
<i>Cacopsylla fraudatrix</i>	19				
<i>Cacopsylla hippophaes</i>	1	2			
<i>Cacopsylla intermedia</i>	22				

Species	Belarus	Poland	Northwest Russia	Lithuania	Livonia
<i>Cacopsylla iteophila</i>	2				
<i>Cacopsylla ledi</i>	1	2			27 as <i>Psylla ledi</i>
<i>Cacopsylla mali</i>	1, 13, 14 as <i>Psylla mali</i>	2	4 as <i>Psylla mali</i>	21	27 as <i>Psylla mali</i>
<i>Cacopsylla melanoneura</i>	2		20		
<i>Cacopsylla merita</i>	23	12 as <i>Psylla merita</i>			
<i>Cacopsylla moscovita</i>	1	2	4, 12 as <i>Psylla moscovita</i>		
<i>Cacopsylla myrtilli</i>	2				
<i>Cacopsylla nigrita</i>	2	4, 12 as <i>Psylla nigrita</i>		27 as <i>Psylla pineti</i>	
<i>Cacopsylla parvipennis</i>	1	2	4, 12 as <i>Psylla parvipennis</i>	27 as <i>Psylla saliceti</i>	
<i>Cacopsylla peregrina</i>	1	2		20	27 as <i>Psylla crataegicola</i>
<i>Cacopsylla pruni</i>	2	8 as <i>Psylla pruni</i>			
<i>Cacopsylla pulchella</i>	1				
<i>Cacopsylla pulchra</i>	1	2	4, 5, 12 as <i>Psylla pulchra</i>		
<i>Cacopsylla pyri</i>	13, 15 as <i>Psylla pyri</i>	2	4 as <i>Psylla pyri</i>	21	27 as <i>Psylla pyri</i>
<i>Cacopsylla pyricola</i>	2				
<i>Cacopsylla pyrisuga</i>	15 as <i>Psylla pyrisuga</i>	2			
<i>Cacopsylla saliceti</i>	2			27 as <i>Psylla salicicola</i>	
<i>Cacopsylla sorbi</i>	1	2	4, 6 as <i>Psylla sorbi</i>		
<i>Cacopsylla ulmi</i>	1, 28	2	8 as <i>Psylla ulmi</i>		
<i>Cacopsylla visci</i>	2				
<i>Cacopsylla zetterstedti</i>	2				
<i>Chamaepsylla hartigi</i>	1	2 as <i>Psylla hartigi</i>	4 as <i>Psylla hartigi</i>		27 as <i>Psylla hartigi</i>
<i>Livilla horvathi</i>	2 as <i>Floria horvathi</i>				
<i>Livilla radiata</i>	2 as <i>Alloconeura radiata</i>				
<i>Livilla ulicis</i>	2				
<i>Psylla alni</i>	1	2	4		27
<i>Psylla betulae</i>	1	2	4		27
<i>Psylla buxi</i>	10, 11	2 as <i>Spanioneura buxi</i>			
<i>Psylla fusca</i>	1	2	4		27 as <i>Psylla perspicillata</i>

Species	Belarus	Poland	Northwest Russia	Lithuania	Livonia
Triozidae					
<i>Bactericera acutipennis</i>	1	2	4, 8 as <i>Triozia acutipennis</i>		27 as <i>Triozia acutipennis</i> and <i>T. munda</i>
<i>Bactericera albiventris</i>	2 as <i>Heterotriozia albiventris</i>	4, 5, 8 as <i>Triozia albiventris</i>	27 as <i>Triozia albiventris</i>		
<i>Bactericera bohémica</i>	2	4, 16 as <i>Triozia bohémica</i>			
<i>Bactericera calcarata</i>	24				
<i>Bactericera curvatinervis</i>	1	2	4 as <i>Triozia curvatinervis</i>		
<i>Bactericera femoralis</i>	1, see checklist	2	4, 5 as <i>Triozia femoralis</i>		27 as <i>Triozia femoralis</i>
<i>Bactericera maura</i>	2	5 as <i>Triozia maura</i>			
<i>Bactericera modesta</i>	2				
<i>Bactericera nigricornis</i>	2		20	27 as <i>Triozia nigricornis</i>	
<i>Bactericera parasiriola</i>	25				
<i>Bactericera reuteri</i>	1	2			
<i>Bactericera salicivora</i>	2	4, 5 as <i>Triozia salicivora</i>			
<i>Bactericera striola</i>	4 as <i>Triozia striola</i>	2	4, 16 as <i>Triozia striola</i>		27 as <i>Triozia striola</i>
<i>Bactericera substriola</i>	1				
<i>Eryngiofaga deserta</i>	23				
<i>Trichohermes walkeri</i>	1, 17	2			27 as <i>Triozia walkeri</i>
<i>Triozia abdominalis</i>	2 as <i>Triozia abdominalis abdominalis</i>	4		27	
<i>Triozia agrophila</i>	2				
<i>Triozia alacris</i>	2 as <i>Heterotriozia alacris</i>				
<i>Triozia anthrisci</i>	1				
<i>Triozia apicalis</i>	18	2 as <i>Heterotriozia pallida</i>	4 as <i>Triozia pallida</i>		
<i>Triozia centranthi</i>	2	2 as <i>Heterotriozia apicalis</i>	21	27 as <i>Triozia viridula</i>	
<i>Triozia cerastii</i>	1	2	4		
<i>Triozia chenopodii</i>	2 as <i>Heterotriozia chenopodii</i>				
<i>Triozia chrysanthemi</i>	24				
<i>Triozia cirsii</i>		2 as <i>Triozia viridula</i>			
<i>Triozia dispar</i>	2				

Species	Belarus	Poland	Northwest Russia	Lithuania	Livonia
<i>Trioza flavipennis</i>	1	2	4	20	27
<i>Trioza foersteri</i>	2				
<i>Trioza galli</i>	2	4, 8		27	
<i>Trioza laserpilli</i>	25				
<i>Trioza munda</i>	2				
<i>Trioza proxima</i>	1	2	4		
<i>Trioza remota</i>	1	2 as <i>Heterotrioza remota</i>	20	27 as <i>Trioza dryobia</i>	
<i>Trioza rhamni</i>	2	4, 5, 8		27 as <i>Trioza abieticola</i>	
<i>Trioza rotundata</i>	2				
<i>Trioza runitis</i>	2				
<i>Trioza saxifragae</i>	2				
<i>Trioza schrankii</i>	1	2 as <i>Trioza schranki</i>			
<i>Trioza senecionis</i>	2				
<i>Trioza latrensis</i>	2				
<i>Trioza tripteridis</i>	25				
<i>Trioza urticae</i>	1	2	4	20	27
<i>Trioza velutina</i>	1	2 as <i>T. galli</i> (in part)			27